Menlo Park Notebook #117 [N-80-07-10], Cat. 968

This notebook covers the period July 1880-January 1881 and contains 283 numbered pages. It is the second of two journals kept by Charles P. Mott, which record daily activities at the Menlo Park laboratory (see also Menlo Park Notebook #53). There are also six pocket notebooks that were probably used to record these daily activities prior to their being entered, sometimes in expanded form, into the larger notebooks (see Pocket Notebooks). The first journal begins approximately one month before the earliest extant pocket notebook. However, the last pocket notebook contains entries for the period January-March 1881, which are not found in the journals. Some of the entries in the journals are cross-referenced to the experimental notebooks. Together, these books provide a narrative record of the last active year of the Menlo Park laboratory up to the time that Edison moved to New York City.

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Lamp posts. A number of large turned lamp posts with a design by Mr. Rennie were received this morning. They are designed for the large fancy globes and will be in all conspicuous points.

Edmunds Lamp was examined on the pump and tested. Resistance cold 4.83 ohms hot 3.00 ohms and at 17 candles gave 9.6 per horse power.

Bamber. cut from top or outside edge of fans Resistance cold 1.88 ohms at 16°c. 1.14 ohms and gave 8.6 per horse power Book 104 page 26 &c.

Black Hills. Stamer, has with rich ore and tailings from the Black hills and reports plenty of the latter to be had there almost for the taking of it out of the way.

Pump. Holgin called my attention to a pump he had recently made and which had been tried by Mr. Hill. it differs from

the other only in having three contractions in the drop link instead of one as in the other. he claims that the additional contractions act as relays and permit any one from returning after it has been started across the wire and cannot allow the second contraction. still claims the scamp to work very nicely and fast.

Tunnel leaving Logan today cut end off of armature shaft for a reason to allow on a stuck bearing for seven year motor.

Was asked on pack was Mr Bachelor, Tom and the principals on lamp machine the former a little on capitol saloon. Smith and one or two assistants on magnetic house. Logan and Martin on car of electric locomotive. Samuel in lamp factory. Jamo on R.R. and on Klein down on 5th & hundred pumps. Beatty Cummer & Van Blow on experimental carbons Olsson & blacks also absent

Bamboo. A bamboo lamp with a Saturday was put at 111 candles this morning got very thin at lamp and lasted 1 hour 15 minutes.

Interference evidence in Interference case with Maxim on use of platinum in electric light is being taken to day.

Armature. Another armature in the first machine was singularly burned out to day. One trip on Rail Road had been made and no apparent diminution of current at time of shutting off near Depot. but when connection was made for another trip no current was on and a short blow on the whistle indicated trouble inside. On examination the wires were found intact but the solder at commutator had melted. and thus thrown out the machine.

Lamp Factory. All wires for Pres. &c. have been run to and connected at Lamp Factory, Telephonic communication opened between this and Mr. Morris's office. A couple two men putting up the pipes for the Root Blower which was taken down and cleaned and adjusted for Sunday.

Mr. Pratt cutting out the bottom of lamp same to admit the back part of gauge glass and has one remained of the lamps mounted and ready for rubber tube connection.

Double Lamp & Holder. Mr. Pratt today made Patent Office drawings of the double lamps and holder for the same from sketches made by Mr. Edison same general principle of lamp he mentioned in our date of June 18 and as originally sketched in Book No 63 page 167 &c. The P.O. drawings represent the Globe Lamp instead of tube which we have taken.

Circuit changer. Francis is fixing up an arrangement for rapidly changing the current for the purpose of experimenting on lamps while running the current which heats them. He provides a connecting ferrule. Sawed from one side about 3/4 of an inch from the end, in to about the center, near the opposite end sawed in the same way but from the opposite side. These two cuts are then connected by another cut ~~connecting the two first cuts~~ in such manner that the ferrule is divided in two parts, insulated from each other but ~~overlapping~~ interlaying in such manner that a block contacting with it, connects first on one side and then on opposite side as the ferrule is worked on a slide to which it is secured, and which is rapidly worked by an electro motor, using four knobs on the ferrule. two on the entire split part and one on each other end, reverses the current with rapidity dependant on revolving speed of ferrule.

Captive balloon. The other evening Mr. E. had the current of small dynamo turned into the motor with which the balloon experiments were being made and turned on the commutator. Mr. Faldner has to day finished a new motor more powerful than the other and seemed to it the same when previously used. The dynamo current was again applied and the wheel revolved with fearful rapidity, all standing well back expecting to see the wheel fly to pieces by centrifugal force. The motor was placed on the scales, and indicated a lifting power of 4 pounds.

Simon Ray Miller and Mr. Jones interested in Mason interference.

Lamp made with new platinum wires sealed on the leading wires in imitation of Sir Joseph Wade's lamp returned for examination on the desire of Edison.

Current Diagram. Tried on a lamp that burning is made the lamp rather redder and did not reduce its life as much as 1.00 if not better than when permanent current has been used.

Captive Balloon. Mr. Palmer sealed on the motor of captive balloon in place of the old wheel from Palmer lamp room. Motor and lifted six ounces. Motor was removed this and lifted twenty one and by removing the two rubber rings the center by metallic axis was able to lift 17 ounces. The frame may be set at such angle as will give a fine motion to the air and make a neat and desirable apparatus to combine with electric light system for ventilation or keeping air in room in agitation.

July 13 (continued)

Mr. Travis Testa of Mr. Upton and found to be badly arranged. Sent his chemist as near as I can guess from name is Otto. See Bk. 103, page 113.

Wood Miller. Began set several blocks in new wood miller and for the first short found in to work very well. The mixer only requiring a shaper and new edge.

Wood dust. Workmen commenced laying the walls for the furnace for burning wood dust.

Carbons. Mr. Edison and Batchelor made description lists of solutions and their dilutions of being applied to carbons, or material before carbonization. Book No. 105 page 21 &c.

Bamboo Lamb. Carbon split separating it into two distinct fibres. Never before observed in a carbon in breaking.

Returned. Mr. Upton from his trip last with family.

Wednesday July 14.

Pumps. Four finished and working pumps using up all suitable tubing on stores now finished up this morning, having been the principle work of the glass blower since Sept. 7 or very nearly five months. An average of about four pumps per day for two men and part of the time two assistant glass workers.

Carbonized Cards. Tests have been to day by Carbonmonda & Mr. Upton on lamps with cards saturated with different solutions. One best lamp run on running current lasted nine minutes. Another run on running current burned 1 hr. 41 M. above Book No. 103, page. 121 &c. & 103, p. 141.

Visitors. Mr. Barrows of Barrows & Hilliard with a couple friends, notably to observe the magnitude of the dust burning furnace the design of which is of Prof. Ruhm. Mr. Edison suggested to him to experiment on light weight high pressure boilers portably for aerial navigation experiments.

Carbonization. Some crash carbons having the ends painted with solution of Liquid Silicate Ammonia and Glucose. were recarbonized by the Electric Wire Lamp. Results Nos. 265 to 270 were insulated and of carbons then treated to Nos. 105, 92, 23 & 24 in 0.7, 0.790 1888.

Francis Bradley is getting out some Baxter fibers with which he has .020 with insulating coat same as regular. 1.2 to .012. Fibers then very different to one from the former and looks like a regular.

Yellow Jacket. A photograph of the shafts the 5th the Yellow Jacket Mine showing the hole and distance the pumps for removing the water have to be worked was taken, and Messrs Edison Hornig and Batchelor are discussing the Dynamo and gearing of applying dynamo motors for the working of pumps for deep mining.

Ore Separation. Dr. Moses had Andrews make a chest or small sluice box about one foot wide and three or three and one half long with bottom covered with glass. for experiments on the separation of ores suggested by Mr. Edison. he then procured two pieces of copper tubing perforated with a line of fine holes, and by forcing water through them and permitting the water to flow down over the glass which is set at an incline he has shown some very nice work in washing the crushed ore

R.R. grade. At noon to day some of the boys were trying the flat car on the hill to gulley and made a trip or two successfully but finally when starting from the top, the brake chain broke and the boys unloaded themselves except Hickman who was thrown when the car jumped the track and was pretty well

July 15.

Frame and the brake of car broken and bent up, otherwise the car was not injured.

Loops. Mr. Batchiler is to day painting the inside of some Bamboo loops before carbonization, to be run through the furnace but once.

Bamboo Frames. Mr. Batchiler sketched shape and dimensions of Bamboo looks and figured the shrinkage of carbonization to be 20 %. Book No. 102 p 21. Arduous is making the frames in which to carbonize the Bamboo allowing for the 20 % shrinkage

Conductors. The men that have been at work on laying the conductors to the Street Lamps since May 1. got them all down to day. but there is still a large amount of it to tar, cover and fill trenches. This job has taken two & one half months ~~for~~ an average I shown gangs of two men in the work

July 15 15

Gas Works. Gas Apparatus for works at Lamp Factory was received from Railway and put in position at works requiring rapidly on gas and air for lights for the glass House.

Visitors Gen. Palmer with Mr. Painter also the European Telephone man Ser

Mr. Clarke also returned from his vacation trip having been absent since July 2?

Pay day. Last week's Pay day was postponed some reason connected with visit to day

Lamp Factory - Douglass Lamps for test, a letter received and delivered this morning.

Track. The rails of Electric Rail Road were raised and lamp felt put under one rail and tar under the other for insulation. Men are working at it from depot out.

Connections to Street Lamps were to any tested by Mr. Upton. Book No 103, pages 45-50/55-58 were circuit, wire to wire 55. Gross Ground 25 & 43 Ohms. 25 were circuit South wire to wire 1.4 Ground 4.2 and 8.2. 50 were circuit wire to wire 61.8. Ground 25.6 & 57.5 Edison line wire to wire 1.6 Ohms and Ground 5.8 and 9.1 Ohms. It will be seen that some of the circuits are very badly insulated and all more or less defective. Men have been set at work uncovering parts of the trench of 25 wire circuit and removing

the dirt from around the lamp posts after the boxes had been raised out of the ground at low water points. It was noticed that with same results. It seems a little strange that unannounced men should be permitted to put down nearly five miles of wire and cover it without being required to test a single circuit or wire until the entire work is finished and it will now require considerable extra labor and delay in putting the circuits in working order.

Wood Miller. Dean of wood drilling machine cutting the tops of .010 diameter beautifully and satisfactorily all the way across and was preparing the saw for cutting them off. When Mr. Edison admitted the inspection of the machine, directed him to clean it up, take it apart and put away, as at present the fibers were an improvement on the wood and the machine would not be required

unless at some future time. This Machine was commenced about Nine 11. and is so complete in all its 226 parts or more and so perfect in working that it is ~~[illegible]~~ among the ~~[illegible]~~ a place among the ~~[illegible]~~ the archives rather than being an ~~[illegible]~~ probability carried off prize by some [illegible] Carbonization Mr Batchelor made some carbon by dipping the cards in hot syrup and some in an alcoholic solution of syrup. and then decarbonized. the syrup collected in globules but was carefully removed by Mr Edison.

Visitors A large party of French gentlemen also one of the London Telephone men and a Dean with Mode[illegible] sent by Gen Butler from Lowell Mass.

Absentees Mr Clarke gone to Philadelphia to note progress and hurry work on the Porter Allen Engine

Armature. Force finished an armature, with same amount and quantity of wire but wound and connected in such way as to give .55 ohms resistance instead of about one seventh of an ohm as ~~[illegible]~~ the other have

Absentees Crosby and Lawson were heard from to day, in the western mining regions as representing themselves from T. A. Edisons Laboratory, properly furnished with his mining discourse and applying for to Bosses for Mines on Tailings Grounds.

Bamboo. Carbon of Bamboo with slight notch cut in one side lit burning at about forty candles in about five minutes the lamp on one side melted down forming a bridge on the end of the wire, and extinguishing the carbon. Lamp Number 1277. Book No. 51, page 159.

Blow-pipe. Mr. Howe experimenting on metals in gas with blow-pipe, observes to day, that in using Jet iron coated with carbon from lamp flame, and metals such as zinc, tin, lead &c. in connection with soda, placed thereon and subjected to flame by blow pipe, each metal had its own peculiar characteristic of the color or shades deposited on the carbon in the immediate surrounding of the metal. All of which he claims as mainly being and originals.

Other Lamp Conductors. Mr. Howe at work all day on the 25 mile circuit, removing the soil from around the posts and uncovering the boxes in many places, but late this afternoon when tested by Mr. Upton no improvement or change was found to have been effected. And as Mr. Howe to whom this work had been entrusted seems ready and more than willing to take advice, and listen to suggestion

that if taken in time might have saved him the annoyance of having made a partial failure, and would surely have saved Mr. Edison the extra expense of redoing this work.

Work general for past week. Men at work at Gas and Air works and others at Lamp Factory. Men finishing the preliminary taping of the conductors to Street Lamps. Gas received work Miller, Cook & apart one foot away. Gear of electric locomotive about finished. Mr. Batchelor again interesting himself in experimental carbonization. Mr. Edison and Upton experimenting with and testing lamps.

Gas Home. Frame raised for gas house at Lamp Factory.

Carbons. Mr. Batchelor starting platina foil on the ends of carbons and recarbonizing them the object being to make better contact with the clamps and lengthen the ends.

Monday July 19. 1880

Slotted plates. Yesterday Flannery cut some plates with slots about 1/32 of an inch wide in which to ~~cc~~ carbonize after the carbons have been treated with a solution on the ends covered with Platina foil.

Lapidus Balloon. Brandon Free prepared one of the sewing machines motors to work the shut iron fans. 2 ft 9 in long and tapered from 1 1/2 inches wide inside to 9 inches on the outside and tried it to day. results not very encouraging. The original effect of the electric balloon will be found on page 55 of Book No. 108 and dated July 9.

Mining Mr. Edison directed several drills to be tried in experimenting on the exploration of ore by air blast. Book No 108. page 291. and instructed Brandon Free to make a box about 2 ft deep, 2 in by 12. and arranged with a perforated pipe on one side of box to give air blast against the sand & dropping through a small slot in the pipe.

Bamboo Pens. Some Fine Bamboo (genuine) was obtained and given to Beadley pen wheels to cut some loops. (The Bamboo previously used was Calcutta Bamboo) The genuine is very fine grained and worth more than the other.

Tar Insulation. The leakage in the Street lamp Conductors was thought to have been caused to some extent by the conducting of the tar used in the boxes. To test the tar, two copper plates were immersed in a bucket full and tested by Mr. Upton proved to be a good non conductor. Book No 103 page 183. The copper tacks which had been used to secure the wires in the boxes were taken out but made only 5 ohms difference.

Magnetic Separator. Wood. commenced work on the frame for practically working the magnetic separator and on a full & complete working mill to fully test its practicability and commercial value for mining purposes.

July 19

Back Regular. A regular back fibre lamp was tested by Mr Upton. measuring its resistance as it was brought up gradually (to study the rule governing the fall in the resistance). At 7/8 candles .02.65 Ohms. 8.6 candles 103.25 Ohms. 9.8 Cand. 102.4 Ohms. .4 cand. 100.6 Ohms. 17.5 candles 99.15 Ohms. 44 candles 89.40 Ohms. Book No. 103 page 185 &c.

Rail Insulation. Mr Edison sketched several forms and ideas for insulating the rails for an electric Rail Road, which he gave Mr Clarke with request to draw them out more fully and to add any ideas or suggestions of his own for trial on the present track, in connection with the insulation already tried and mentioned under date July 19, to determine the best and most economical method of rail insulation.

A gentleman connected with the Metropolitan management RR of London also clerk of the U.S. Board

Tuesday July 20, 1880

Track insulation. (Insert note Rail Insu. April page) - Mr. Upton tested the track today. The ground and sleepers being very wet from heavy rains. Track apart near top of hill between rails 5 Ohms. disconnected at end of insulated rails about one hundred feet from Station. Car rail ground .12 Ohms. Tarred paper under rails and spike heads 12 Ohms. Book 137, page 17 &c.

Lamp Machine. Mr Batchelor made sketches and wrote description of a number of improvements, on the model to be added to the machine to be made for practical use. Book No. 102 page 23 &c.

Lamp Factory. Sir Wm was at work today caulking the floor under the Mercury pumps in the Lamp Factory, the iron reservoir pipes having been taken up to give them a chance to work under the double row of pumps now up. Douglas pump arranged and put in the well.

Small Engine at Lamp Factory together with the boiler were taken out and apart and prepared ready for shipping.

Fibre Formers. Dean is making a pair of formers for cutting out fibre sachets. One is designed only to cut one side or edge and intended to be screwed to the bench and drawer and used together by a treadle leaving the operator both hands to adjust and use in cutting. The other operator can by use of the one former cut the straight edge and pass to second operator to cut the concaved side.

Water. The engine was run during noon time to day to pump the water out of the Pond, and there have been set at work shoveling and drawing out the muck &c. to deepen and give the Pond greater capacity for holding water.

Visitors Coxdara & Lowry with friend. Mr Miller

Gas Carbonizing furnace lowered.

Ore Washing. Mr. Edison made several sketches of different apparatuses to be made by Martin Enc for experimenting on washing ~~ore to~~ and other separation of ores. One of five concentric planes each a little lower than the preceding one and each plane provided with a rake worked by an excentric on a counter shaft running parallel with the plane, and moved back and forward across the plane, down each rake is connected a flexible rubber hose to convey the water ~~through~~ which may be discharged as found by experiment to do the most effective work. Another is of a shallow five inch deep tub revolved on a frame work in such manner that it may be easily rotated and is given a quick back and forward rotary motion by an excentric or crank ~~& lever~~. Water is conveyed into the tub by hose or pipe, but could not tell from the sketch what style of discharge was intended to be used. Bros. others so indefinite in the details that could not describe them until apparatus made.

Average test of Lamps. From the lamps so far tested on Lamps ab 44 candles, the average life was taken and found to be, for Bark 6 Minutes, Calcutta Bamboo 17 Minutes and Paper about three minutes. The Bamboo carbons were in many cases imperfect which has probably caused the average for them. Not which need be unnecessarily raised when proper precaution and care is used in selecting only perfect cut and prepared carbons. Book No. 12, page 78c. A paper carbon lamp tested to day at 44 candles lasted 8 Minutes and at 13 candles gave 11.5 sec. sound. Book No 103. 002.78c.

Grace's circulation. Mr. Edison directed that one hundred feet of track should be insulated by use of hard rubber blocks ½ of an inch thick and four inches square, both outside edges to be turned up and one top of rail flange so the spike head would also rest on the rubber according to the instructions given

of rubber suitable for the purpose the cost per mile of this manner of insulation would be about $176. Mr Clarke also sketched and described a method for insulating rails in Book No. 115, page 1.8c. in which he uses a hard wood block fitted to the flange of the rail and extending from the body of the rail to the little beyond the flange. And over this places an angular iron washer bent to fit the wood lap down over the side and having two slots cut and bent out to enclose the spike and prevent the washer or wood from working out of position.

He is also at present carefully studying up, and searching for data as to the power required and best mechanical means of construction of an electric locomotive for practical heavy freighting use.

Absent Mr Batchelor went to New York. 11.00 to see his family off for Europe

Gear. Dow Man commenced putting the arm and clutch gear on the electric locomotive.

Revise current. The motor and cylinder for rapidly reversing the current was adjusted and fixed up by Johnson Att. and a simple lamp run on the reversing current burned quite steadily, the flicker was only perceptible in the lamp but was scarcely noticeable in the light. Bamboo at 1½ candles Last 2 Minutes and a Best 20 Minutes. The Bamboo however was a bad carbon. Book 20 p. 3, page 25.

Magneto calls. A Dean brought a new design of switch board by Bergmann. Mr E. liked the design but found the contact. He also brought a Bergmann and Blake magneto calls. The former worked through 1000 ohms resistance and the latter through 1200 ohms. Also a Edison telephone arranged with a device by

Johnson, for the battery call, which appeared very simple and effective but it was not tried.

Carbon tester. Mr. Edison suggests that by heating the fibres after they are cut out any unevenness or weak of, with may be detected by the inequality of the circle and may be thrown out. He also sketched an idea of a bell to be attached to a large Geissler pump, in which one dozen of or thirty, carbons may be placed and after sufficiently high vacuum may be made to a red, and inequalities or spots be thus detected. And only the perfect and desirable carbons be placed in the lamps.

Japanese Bamboo Two lamps connected on the pump.

Crow to move 5 Scales were used on the car 90. } The morning to break dynamometer test of seven minutes between the weight and case of the sledge road. On starting the open car the scale read 16 pounds. To start open and low car 64 pounds. To keep both running after motion with engine on idler forty lbs. To start engine 86 pounds and to keep up motion 64 pounds.

Japanese Bamboo, two lamps of Japanese Bamboo were completed and tested this morning, both carbons were slightly defective and at forty seven candles and current ~~and~~ carbon 15 and one 20 Ohm. Work 103. Page 203 Lc

Carbonization. Some copies of white holly, Seattle wood, Tulip, and Amaranth were cut by Bradley on fibre former, one Amaranth carbon, was got out and in the lamp in perfect shape. The wood was very brittle and was soaked in alcohol before being Book No 37 Pg. 175

Gear Men are at work putting on the arm and clutch & creeping gear on the electric locomotive.

Tests incandescent. During the rainfall of the rain and after it had been raining two or three hours Mr. Upton tested the tracks and found only 4.8 ohms between the rails. (The track was in as unfavorable a condition as in practice it could be by atmospheric influences.)

Cutter. The heavy rains now stopped all work on cleaning out the zones for the present, as well as all outside work today.

Fibre former. In addition to the box and trade device for holding the former together (see July 20) Dean has added a frame, mounted on a frame, which ~~[illegible]~~ composed of three bars the center of something soft which may be carved with soft cutters, and also down on the other to force it evenly in the slot, without the danger of bruising or injuring the fibre.

Papers The New York Herald of Sunday published a long descriptive article on the electric rail road and its adaptability to the Elevated Roads. Daily Graphic artist sketched some photographs of electric Road see rail simulation. The road was again tested this morning and found to be rather better than yesterday. The cars were laid regularly on sleepers in corner of laboratory. Ties for the purpose of test and experiments on insulation.

Bamboo Lamp, lighted at 48 Candles and lasted 68 Minutes. The blue in the lamp disappeared after it had been burning a few minutes. Now did not again return. A Regular Bath was then lighted on reverse current and burned 94 Minutes. Book No. 112 page 156.

Small Engine from Lamb Factory shipped to Hudson Michigan

Patent Office Drawings. Mr. Edison submitted several devices and systems for interrupting electric currents at different points in a circuit for maintaining the electric motive force. Also two devices for holding carbon lamps and for sealing the ends with metal. Also a Revolving Electro Motor Switch.

Insulating wire. Mr. Clarke made a diagram of a machine for wrapping with strips or other material the cables of the light circuits. It is a cast iron plate with an aperture through which the cable may pass and the plate having the spools or bobbins of material secured near the perforation revolves around the cable or wire. It is run by hand with crank and proper gearing and is moved along the wire or the wire may be carried through the machine. It is made to fit various sized cables by movable or sliding centering pieces.

Visitors Friday of Herald also a large party of ladies who were taken several trips over the road.

Saturday July 24 - 1880

Papers. Herald of today also has an article, purporting to be interview with officers of Elevated Rail Roads of New York on the subject of electric roads concerning their adaptability to elevated roads same lines. Hickman was set at work on the 25 mile cable, winding it with strips of muslin, preparatory to turning for better insulation.

Felon cutter. The felon holder or clamp for shaping and cutting was tried. The single screw in the center was found to spring the bars so it did not closure evenly the whole length, and a step piece was cut to bring the bearing near the ends, but it was found that the wooden bars then sprung. It was decided to get a cast bar and ~~bolts~~ the clamp together with a double solid right angled lever ~~acting under~~ with the bits coming up in front of the former, ~~perpendicularly~~ and the bar came attached same as before.

Carbonizing Frames. Drawers is making a frame for carbonizing frames leaving the inside piece loose instead of riveted as in others, and with a light weight filter to press the ones down flat and burnt thro from wrapping or cracking out of shape, instead of the ends drawing up they are permanently secured and the loop containing drawer with it the inside piece attach at the time fuse is in approximated shape. Mr Hawthorn has to day tentioning machine which the ends were clamped with light weights which were drawn up as the carbon shrunk, but did not prove entire satisfactory.

Oil carbon. A very interesting experiment was made to day by immersing a carbon loop clamped and connected to inner tubes the viscous oil and brought up to incandescence by the current. Globules of gas or air were emitted from the carbon in at length that the oil (assumed a smoky look) appeared to be infused with carbon, on surveying the carbon it was found to be considerably

increased in size, yellow in appearance, and distinctly homogeneous. It was placed in a lamp, exhausted and burned at 16 candles for 14 minutes when engine was stopped.

Work general. Gas carbonizing furnace by putting in the gas and black pipes and fixtures. Blacks on Electric Locomotives. Mr Batchelor on carbon and apparatus for carbonizing. Considered gang unearning. Steel lamp circuits. Now finishing 1/8 gray for electric locomotive.

Bad Elec. Two candles used from Baltimore Md.

Gas Dielectric. Yesterday Mr Batchelor at work on electric Rock drill and Shutters special application of the electric motors for that purpose. Using in direct cause gear and cam movements, item important one on page 56 of Book No. 102, the drill is connected direct to the revolving armature, and is thereby capable of being run at 2000 or 3000 revolutions per minute. And with axial stroke of probably one half inch imparted to it by a lifting cam, also having a short stroke is capable of acting rapidly and rather incessantly pecks rather than striking heavy blows. Electric Book Vision pages 47 to 59 inclusive.

Kerosene carbons. The experiments with carbons for use in kerosene oil have been continued to day and the lamp prepared and partially tested on Saturday was put at about 350 candles and lasted 13 minutes resistance was reduced when at that

Heat to 7.2 ohms. Total amount of 50 ft pounds, per candle or 700 candles per horse power. In this case the resistance was too low to permit of practical subdivision of the current. Several attempts were made to deposit the platinum upon but in all cases the accumulation of the gas in one bottle or the wire caused it to melt and separate in one case however a pretty fair deposit was obtained and under microscope showed very homogeneous. It was given to Dr Hall with directions to attempt the removal of the platinum by dissolution leaving if possible the carbon in wooden form tubular form. In an experiment the glass tube leaving the carbon which was measured by Mr Batchelor and found to have increased from .012 to .0220 or about four times the bulk. C. Bast carbon was then treated by heating but little in oil and put in lamp fitted at 48 candles. resistance 81.5 ohms Volts 83.3

Volts and case 8.75 per horse power. It is record that I can learn was left of its like. Book No 137 pages 58 &c.

Carbon bulb. The portion said bulb carried for the purpose of electric connection was broken today by having one inside of wood and tried on the rails. It takes a good time before of the rails and was very little flash, and refused to strike. The only function being the sliding friction of the forward portion to obviate which this flask carried and sketched in Book No 115 page 56 &c one with roller and the to carry the weight in the forward portion, also to attach with roller on an incline.

Blast tubes. A blast pipe was sent into Dr Hall's room from the box leading to furnace to be used by Dr in his furnace for assaying purposes.

Carbonizing furnace with lower end, fire time, the ends of the carbons are secured and tightly weighted, and the contact pieces act as a weight which is drawn down by the shrinkage of the carbon

July 26

which is left in shape by contracting around the sliding central core.

Glass Sand exp. Shadow test moving back and forward & day motion by two electric ~~from~~ shaft and with round pipe perforated on inner side near sinar supply room, but no platinum and air glass connection made ready for trial.

Spark Lamp. A regular lamp had a platinum wire sealed through the globe, on the wire was strung a bit of carbon pipe which would slide to within about one half inch of the regular lamp. I judge for experiment on attempting to bind up carbon lamp from the strip carbon by ~~spreading~~ across.

Visitors. A couple Lambar R.R. gentlemen for information on the R.R. and the coal and rights to uses also Chaskar and friend and Mr. Wilber.

Absent. Dr. Edison left for Fort Gratiot

Spark Lamp. Described yesterday was tried to day by connecting the lamp regularly in the circuit in Phidomotive room and from Battery through the insulation coil connecting one wire to one of of the lamp wires and the other connected to the platinum seal in the globe and to which the carbon slip is clamped, the spark ~~could only be~~ was only perceptible by the "flow" or disintegration carbon, and that only slightly, the attempt to wind up the carbon was to all appearance successful and the lamp broke in a short time.

Glass Sand. The Fish device for experimenting on sand separation by air Glass described yesterday was tried today. Air ~~not~~ from the blower here sufficient air pressure could not be ~~forced~~ forced through the small perforations to fully test the apparatus. It was then removed to the other side of laboratory to be tried as a washer, using water in the pipe instead of air.

Continuation. Mr. Batchelor has been to-day experimenting with benzene, paraffine, and petroleum oils, in the proportions, to learn whether the hydrocarbon vapors from 30 units with the vegetable carbon similarly to the union obtained by the intermission of the lamp in benzene, or all these liquids the carbons came out pure and looked very homogeneous, the one in coal showed under the microscope looked as though the small particles of coal had attached itself to the lamp. Some were tested in lamps to-day.

Test. Mr. Lipton made a test of a regular Bast carbon lamp film carbonized in the former. At 16 candles 120.15 ohms. 13.5 per horse power. At 48 candles 110.6 ohms and 9.1 per horse power. Last at 48 candles 67. Minutes Book No 112 pge 8 &c. Also made calorimeter test of regular old Bast lamp. Book No 112 pge 538. Visitors Prof Barker & friends. Also Mr. Young, and Mr. Prof. the boy saw another - from Hard and Foreman present.

Continuation. Mr. Batchelor is continuing the experiments with benzene, petroleum oils & the petroleum in the vacuum during the boiling process. So far the tests have been made today, in lamps, in lamps made up chimneys in the Bureau Book No 105 pages 13 &c.

Lamp testing. Experiments commenced in the Lower room - the old Plane frame for these lamps tables - examined during entire time connection between pumps and Mercury tubes.

The motor for the pump was connected up and tried to work all night and with the pumps and gearing in the room was not in the pump.

Mr. Lombard & Mr. Free made the necessary water connections to try the shelter tube or washer. The preliminary trial worked well enough to warrant removing the 4½ barrels to our small engine room where power may be applied to rotating the tube.

Rail Roads. Two dynamos were put in series today and the current applied to the rail road track. The motor was tried and found, when power was applied, ready to be driven by the dynamos inside.

Telephone. Wire was run today from Office to Mr. Edison's Office and telephonic communication opened for purposes of another temporary communication. Mr. E. proposing to have the Tel. Office in connection with Post Office.

Roller clutch. Mr. Clarke completed the details and drawings of roller clutch for connection and Jackson having wooden model made for testing its efficiency.

Visitors. Another one of the Kansas City Journalists

Rails. The rails came in course of Saturday but the weight was tested by Mr. Upton and found 8900 pounds between the ends, the break was near one third from one end. Mr. Upton made a contract with the rail road for more additional rails ordered.

Roller clutch. Drawings are to be made. Turning of wooden model from the drawings is done to test the efficiency. The roller rides on each side against inclines and is thrown against the one or the other by an eccentric on top of frame which moves an additional light frame to which are secured four elliptic springs which extend through the frame and have one of them under bearing on the roller and by turning the eccentric the springs are made to act to hold the roller against either of the inclines desired or it may be set so the roller remain in space of the inclines and free from the rail road and wedge fast either way, would be a certain hold much better in course than the frame are

Dynamo Shaft. One of the exciters ~~[illegible]~~ of the Dynamo shaft, which had been filled with Bakers Putty was found to have worn out and was taken down and issued with same Putty. And a Portable dynamo was put in, & run for a purpose for the 6th.

Carbon Lamp. Mr. Edison gave Bivon a tracing of a Carbon lamp ~~for letting~~ carbons with direction to make the application. It is composed of a large glass receiver, tube to force spirals, tubes which are designed to be light running to transition tube in the large glass, tube which accompanies the opposite side of the glass is another tube tube stop cock running to a smaller glass globe, ~~[illegible]~~ arranged to hold the inner tube and carbon, which is secured therein and made air tight by passing the tube through a rubber stopper and flooding it with mercury similarly, to the stop or flooder used on the pumps, it is believed that the large glass will exhaust the air sufficiently from the main

tube to permit of immediate heating without to note any inconvenience.

Carbonization. Mr. Bivon has a ~~[illegible]~~ made to hold the 16 inch fibres, and with a 38 inch side sliding center piece, out of which he has some nice carbons, the lamp was made with the 6th carbon used at 16 candles has 188 ohms Resistance at 71 Candles has 170 ohms resistance Area Exposed 62 Diameter, Bobb 12, are 64 Vc. He has been using pipe clay around the lid of the receiver to more perfectly exclude the air.

In the evening Mr. Batchelor drilled in the mouth and connected a pipe about two feet long. Some pieces of tissue and thick carbon were put in the pocket and in the furnace, at high red heat gas was turned into the pocket through the pipe and allowed to run for awhile the carbon in being removed was found covered with lamp black or soot due to too low heat or short which was put back and gas turned on at white heat. In this case the carbons were much softer and assumed the fibrous appearance which increased the addition of hydrocarbon to the pocket during

Papers. Daily to day have very favorable telegraphic reports from Henderson chief engineer Steamer, Columbia, concerning the stability and satisfactory working of the Carson lamps and generators provided for that Steamer

Carbonization. Safety globe. Some plans for cans and gas flame applied, in the globe was placed some gasoline and the generated gas conducted to one of the burners in large furnace; in one of the trials the carbon stops burned out & beautiful silver green very homogeneous (in minute image) and showing the augmentation by the carbonization of the gas.

A glass chamber was made in which a tube with stamped carbon can be placed and by rubber stoppers (through which the tube passes) made air tight at bottom, in one side of chamber near bottom is a tube through which the gas may flow and at top is another tube for outflow and burner, the gas from the apparatus was for above experiment used

ignited at outflow tube and the current turned onto the coke, the first experiment the current was left on at low heat for some time and the carbon stops were largely increased by the hydro carbon of the gas. The second trial the heat was kept very high and put on and off a few times leaving it on but a moment at the time, in this trial a Back 6 inch carbon was used and came out perfectly sound and a slite grey in was taken by Mr B to the glass house and immediately placed in a lamp.

Magneto calls. Bergmann and Wallace Elec. Magneto calls. Calls were called by Mr Phelps and ~~pertinent~~ given to the Wallace Electric for the present methods of construction, book 820, 37, pages 258 &c.

Dust coal. The furnace for burning dust coal completed and dust coal burnt; The openings or communications are yet to be made with to the boiler fire box.

Electric Light: a tube 6 long and nearly
3 inches bore, closed at both ends
with parallel terminals, by a small piece
of tubing in the reservoir was placed
about a bit of carbon, and the opening
closed by a florida rubber stopper.
And the whole placed on a pump and
exhausted, water, pulp, fair vacuum was
obtained the oil expanded 15 times, small
bubbles coming up through the oil and
covering the surface. Other high vacuum
was obtained the oil instantly caused
bubbling, on sealing the lamp off it was
tested and found to have collected and
formed additional carbon, from the oil
vapor, and that the resistance had risen
from 2 3/12 ohms, to 72.5 volts or 13000 ft
lbs at 16 candles, results promised.
Book 30. 112 page 89 &c. The inside of
the globe was also coated with carbon
after burning a few minutes.
Wire insulation stops are winding the 20 wire
cable with tarred twine in addition to
the insulation and tar already put on.

Drain pipe. A drain pipe was laid down
from the small engine house to and
connected with the main drain pipe of
running through the laboratory yard.
Dynamos. A private dynamo was set running
for current to supply the pump of about 1 H.P.
running current was interfered with the work
of the pumps.
Night-work. Orders were given by Mr. Edison to
run nights and the service was run the
entire remainder night. Mr. Batchelor and
several of the men worked all night.
Visitors. Mr. Walter Also Prof. Ewing
patents of visual fire alarm invention
Ewing communicator of which Mr. Edison
expresses high opinion.

Saturday July 31.

Mercury. Sulphuric Acid or over 1100 ounces of mercury were received at the Lamp Factory for the vacuum pumps.

Gas Consumption. The weights of coals in course of carbonization for one minute for period of 1000 cubic feet being laid under the coals and thence up over the chimney and were weighed, placed thereon and which the whole mass would just burn so that this test was made.

Coke Furnace. One of the small furnace gas furnaces for carbonizing was set up in the Chemical Laboratory and gas connections made with the steam pipes.

Gasoline Vapor. The six inch carbon treated in Gasoline vapor last night and put in a lamp was exhausted and tested to day. At 16 candles 90.6 ohms resistance 88.3 Volts. At 8.6 candles 92.0 ohms, Volts 12, 0.0 0.9 Amp.

Were received for last week, Pierce Carbon and Bateria Dealing in the interesting experiments with carbons and metal carbons and means of carbonizing. Indiana drawing carbon forms of different designs for use in the large 30 carbon vacuum of gas furnace. Dean drawing the lamps and remove for four or five weeks each week Sept. Edison on electric locomotive, insulated car wheels and other experiments. Edison in Paris on two days drawing specifications. Cunningham drawing glass tubes on the device for holding tubes for testing new gas flame. Carolina: mean date May 28th Several tables filled for glass blowers at Lamp Factory. Hammer drawing the pulsator connections between pumps and vacuum pipes. Branchton going wrapping and taping the 20 mile circuit. Carpenters building the large magnetic separator.

Absent Pierce Carbon and Batchelor went east on 3.20 train.

Monday Aug. 2.

Mr. Bartlett desired an instrument for testing or proving fine sticks 30 to 105 deg. 35 ½.

A mortar of a metal base on table described, and on which the arc fine may be secured, a folding magnifying glass has a error of about .012 diameter put across the bar, removed the base when spring ready for use, in the hole in the bar are secured a couple metalic pieces with the cross approaching to quarter of an inch of each other, after securing the arc on the table the glass and frame may be passed across the fine arc and variation in the diameter as indicated by the two metalic pieces or gauge can be taken through the magnifying glass

Pump Motor. The dynamo Motor and empty pump at lamp factory were run some time today to polish up and bound the bearings &c.

Carbon Glow. The lamp made with carbon electrodes in carbon vapor Friday night was lighted again today after burning 1½ to 2 minutes for a day or minutes a few spots appeared in the tip and at 7 candles [illegible]

Calorimeter test. Mr. Ogston made a calorimeter test of a paper carbon lamp, and then dipped it in bar, then dried it after which another calorimeter test was made the coloured globe broke, [illegible] 800 difference in the results. Book 12-13.

Support for spinning with [illegible] [illegible]

Drop tube. One of the tubes [illegible] has been in nearly constant use for about four weeks was observed to be cracked in the fall or drop tube when the drop strikes the solid mercury column, the crack extended for a length of about [illegible] and appeared to be caused by inside action, and is probably due to the incoherent pounding of the mercury.

6 cp Rambos Lamp burned 3 hrs 24 min at 7½ candles and gave nearly 3 per h.p. the best lamp we got made in new York regulable carbon Book 12 page 119 &c

Phono. Details of today, publishing sketches and comments of Mr Edison on the carbon experiment in connection with a long article on aerial navigation.

Engine. The engine fell into new hands to day by reason the engineer only unceremoniously leaving, "California" taken charge.

Gas furnace. Connected with heat and gas pipes in carbonizing room, the flame did not give sufficient air blast so one of the blast blowers tables and bellows were carried in and the furnace tested. One of the large moulds for 30 candle was put in and on first trial it was found that the gas had gotten in around the joints here and formed a sort of tar which held the carbon together. Mr Batchelor then drilled a small hole in top of mould and rammed fire clay around the tube in the end. The second trial with moulds thus arranged the carbon came out first class

Nursery. The plants of nursery were taken to the breakfast hall to start the stoppers after which they were returned to the factory and hammer set at clearing the nursery, yesterday to pottering in the office.

Research. Dr Rowe has been engaged now nearly a week in searching the scientific books of the office library for all data obtained connected with the electric light and comp. carbon, document No. 127 & 128.

C.O. Drawings. The new draughtsman in the electric office has been on his table, sketches by Mr Edison of the following devices from which to make patent office drawings. A lamp with wire sealed through two small buttons on a stem of solid, or a tube of glass the upper or inner button and glass stem being a support for the wire and the lower button through which the wire are sealed is then sealed with the tube of outer lamp

gutta to prevent the vacuum chamber. Another with wires sealed along the outside of the inner tube or utricle stem and adjusting of sealing at any point with the outer globe. Another with a small globe at bottom of the large one, through which the wires pass and are twice sealed and which is also connected simultaneously with the lamp globe, so that in case of leakage at the first point of sealing the lamp remains ineffectual. Another lamp with a simple straight upright carbon held by a metallic arm to which the upper end is clamped. Another with two straight upright carbons approaching each other at top and there clamped together. Another with two carbon rods in an right angle to each other. Also a room or special carbon with apparatus for carbonizing the same. Also the carbon former with lower center and one weight to which the ends of the carbon are sewed with small

pins, and also a shutter of the device for treating carbons in carbonic vapor as described under date July 30

Visitors this latter are all day.

Fiber clamps, or frames. One pair for six inch fiber with cast iron and under brass for clamping, one finished top down and screw in bearing bench, some fibers are taken out of them and suspend very nicely and are very convenient and effective and with satisfactory in July 14.

Making Bamboo. Wm Wright is making an instrument for splitting the bamboo. The entire end of a stick for a long time on block is drawn through the split and the metal on each side of the stick is then worked down to an edge, sharpened and bevelled, ready for entrance. Shaw is making some more of the rough trimmers or instruments for shaving the bamboo down to uniform thickness.

Carbonization. The gas furnace has been in use to day and with the former in the [illegible] this day. Two carbons were gotten out safely and the furnace gives perfect satisfaction so far. One of the carbons gotten out on first trial was put in a lamp and burned most strongly the heating on pump and in the tube it was then set at 48 candles. One was accidentally broken by falling

In tube 178.1 time at 16 candles and 1016 time at 48 candles Bro. No. 11, opp 200 Sc.

Straightening Carbons. Some of the longer carbons have at times bent over to one side very much after they had been placed in the lamps and heated. To straighten them the lamp is placed between the poles of an electric magnet and the current turned on the lamp. One pole attracts while the other repels the charged carbon and the lamp is placed between the poles in such relation that the other action is utilized to straighten the carbon through the glass tube. I think this "little model" has been used for some time but to day is the first I have caught them at it.

Mercury. The mercury provided for the pumps is exceedingly dirty and hammer is used at once cleaning it.

Note on Gas furnace, with additional data for the carbon former. Bro. No. 108 pp. 39 Sc.

Carbonizing & Filaments } The Gas furnace has been doing excellent service to-day and Andrews is making the standards for the Mondays which are intended to hold about twenty, eleven of which are completed and in use. Filed in Book No. 103, pages 3986 Notes on carbonizing and particularly on the Gas furnace and Carbon furnace, which I began during last night and to-day, in which he suggests to draw the furnace in sections, also to conduct the gas through a rubber tubing to the burner that it may be removed out of the way when not burning. And also some additional illustrations and description of switching and forming shape of carbon.

Paper - Hooked to-day directly Stephen Dudley Field's electric engine, application filed June 9. Patent issued July 13. Cannot claim to have been filed on a year previous. Article states Edison's engine first time May 14 - which is not so - is a mistake

Vacuum pump. The power vacuum pump at Camp Factory was tried to-day with vacuum quite a number of leaks were discovered in the joints of the pipes &c. and at the stopper. And it was very evident that the belt on the cone pulleys would not answer in gear. The belt was slipped every time an effort was made to start the pump with the power from electric motor, which showed a willingness and power to do its work.

Clutch gear. Discovered to-day in Book No. 103, page 6546, under date April 8 a sketch by Mr. Edison of a clutch designed to work on the driving wheels of a locomotive indicating on the rails. Also some notes and memoranda of matter to be incorporated in patents.

Kerosene light. Lamp consisting of 8 candles, after burning 1½ hrs. in had consumed 11 fluid oz. oil. 100 gal. per mile, on candle Book No 112 page 213.

Specs. I hear that the Silver Lake Mine was to day sold a report circulated in Phila. in relation to the electric engine could not find a paper to learn any particulars.

Drawings. Mr. Edison made sketches of some Pumps & Pipes and electric wires connected, also of electric locomotive which was driven the new Record and report to Dicks Patent office drawings.

Hard Road. In second trip to day the wheel was found to work hard, and upon examination it was found that a nut had from the washer the commutator finish today and the brush holding the brushes up. Pulsatic and accumulating upon it. The wear remedied and on the next trial work working satisfactorily. It was on examination found that the wire of one of the dynamos had worn with the case and then it was found necessary to remove and rewind it. One of the armatures of

the dynamos was also turned out but the armature has not been worn and it was unable to assume or assign the point or cause of the wear. The principle trouble seems to have been on the commutator brush.

Leaning Lamps. Mr. Bachelor gave the points of the cause and possible remedy for the lamps leaning or leaning one or the other after reading in the lamps. Leaning in due to magnetic readjustment in a much unusual circulation in the lamp by the seat. Book No. 105 pg. 55 & 56.

Telephone receiver. Mr. Ott with a screw or worm gear in the [illegible] shaped receiver to get more power over and less speed on the chart.

Friction Washer for transmission of power described and sketched by Mr. Herring. Book No. 101 page 116.

Visitors. Walker. Edward and Gordon agents of Mr. Edwards.

Absent. Mr. Upton went east on short trip to family.

Locomotive. The Dragon's new tender with the locomotive to the [illegible]. And the one erected with base work [illegible] and removed; and now that the engine is apart and the gear alone ready to put on, it will be equipped with the substitute gear before replacement on tender.

Clinical Indicator. Another of the Tapp's clinical indicators was brought and set up by Mr. Murgie.

Wind signal for dark work. Team drawing coal down from the car of which the laying on the track for Mr. Edison, Mr. Kendall continuing work cleaning out the Dynamo. Also remodeling and putting new gear in telephone house. Dean moving roman in which to run Santos glass. Mr. Batchelor carbonizing and experimenting on apparatus for that purpose and has written a memo. "Mr. Batchelor now busy of the work getting up specification." Men painting Lamp factory for occupancy, by putting in the final trimmings.

Engine & Boiler. The cabs are removed from the Boiler & boiler house and men are now at work, railway and back yard cleaping and cleaning the boiler and machinery, also removing the necessary connections for the boiler & [illegible], preparatory to raising the deck house against Friday sep. Mr. Batchelor was here and took a look at the arrangement and has one of his boiler views made to coordinate with the entrance.

Carbonization. Mr. Batchelor yesterday drew memorandum of the experiments he had tried with different heat to decover the cause of and possible remedy for running the platinum loops bending to one side, [illegible] 20.100, 0.0261 ½.

To day all attempts at carbonizing have been discontinued at the Laboratory and Mr. Batchelor and Dan Allen are preparing the table and putting up the gas furnace at the factory.

Physics. New York Times to day, publishes a fair and favorable two column article on Edison. Light & electric Rail Road. "to be seen.

Engine. W.) Drove N.E. morning to day, four stops } View site as usual no trains &c. and Logan as usual as acting the gear in the electric locomotive. Steam taking advantage of the hull by having smooth the tires and bearings of shafting and latter steam and workmen and some of the machines shipped and ready and for a few days since. Appears to have action the upper hand of Inventions & engineers. and important items for send are correspondingly scarce.

Stationary electric engine. Hiring is working on the details of a stationary elec. eng. in which a connecting rod from the excentric or crank on the latter shaft works upon an arm extending from shaft of driving wheel to the periphery thereof and there pivoted the same by a bolton which acting on the periphery, and the speed may be governed by the bolton bolton

the ~~the~~ point of the connecting rod and the arm, and the bolton or periphery of the driving wheel. The design is for any use to which a stationary steam engine is ordinarily assigned.

Atent. Mr. Slade gone to Philadelphia & Mr. Lipton still absent sick.

Tuesday Aug. 10.

Telephones. Central Station. Six telephones were received from Bergmann this morning to be set up to demonstrate the call in central station system in the case of Ponds Dynamometer Indicator, to denote the No. of indicator wanted and the drop also made by Bergmann to indicate the No. of the caller. The instruments have been placed at different points about the works and work quite satisfactorily.

Dust coal furnace. A light fire was started this afternoon in the furnace for burning dust coal and we be kept low all night to thoroughly dry the furnace walls and be ready to test it thoroughly in the morning on getting up the steam for House. Mr Castle here to day and pick the oil up in the tanks of new gas house at Lamp Factory to have gas in readiness for the Root pressure blower to give it the pressure ~~in the~~ to morrow if the engine is run.

Old Paper Corp. The castings were taken out of the old Corp. Tracks that have been worn longitudinally and carefully measured by Mr. Butcher. No face 0.063 of an inch as surface of one face and 0.021 in diam 8" long. Book 114 page 1.

Wednesday Aug 11. 80

Machinery, a new large lathe and very large drill press received and set up in shop

Dust coal furnace, was fired up strong to day area 144 lbs 65 lbs of steam for about 1½ hours but the arrangement was very uncertain, pumping water in the boiler reducing the steam pressure to about 110 lbs. and opening the doors in front of boiler produced almost an instantaneous fall in the pressure, in the evening the pressure fell to a very few pounds in spite of their best efforts (unless it proves more reliable and reliable to morrow, the grate will be replaced under boilers and the experiment discontinued for the present) whether the unreliability is due to the inefficiency of apparatus or inexperience of men in attending it remains to be determined.

Work orders given by Mr. C. to run one week day & night as long as there is a man here to attend the

Gas Work. The Root blower at Factory was started and run to day and appears to be efficient enough for the work required of it there, but the gas apparatus seems to be totally inefficient to supply the glass house pots now up in addition of the carbonizing furnaces which are also to be supplied with the gas.

Carbonization. Mr. Batchen is to day carefully making the experiments on heating the carbons differently and at different degrees in the muffle furnace in pursuance of the notes Book 105 page 61 &c. to determine if possible the cause of copper breaking out.

Lamps &c. Memoranda of work to be done and preparations to be made to start if possible 200 lamps on Tuesday Book 112 page 257 &c.

Visitors. A Reporter of the Times.

Absent. Mott & P. in New Brunswick all day on some business on behalf of Edison & for E. & B.

Papa received to day published a lengthy accusation letter from Edison in which he positively contradicts all already so part of Mr. Edison to state temper at least than two or three dollars upon and now to maintain main shaft one or two per horse power and tries to prove his theory and maintain idea that electric lamps must have low resistance for economy of current.

Placing Screw Jump. The cone pulleys were taken down to be replaced with other straight pulleys.

Coal Dust. Sent this morning for a small engine and a Boiler from Jimmy Hart to coal dust furnace and had them up and started by about 3 P.M. It is found to assist very much but he thinks that yet two demonstrations to obtain confidence in the arrangement. Mr. Allen [illegible] the necessary steam pressure

Telephone Calls. Bergman Isaac the allegations suggested to him his some days ago on his Magneto Calls and connected telephone therewith and sent one here to day, it was tested by Mr. Upton and found to work very well. No. 112. Fac 81.

Call Box. John Ac is making a working model for an automatic call box for the Pres. In case it is designed to be used in the telephonic central system the Call Box Annie designed to call any number assigned by the caller or operator.

Carbonizer. Mr. Batchelors experiments with different hues did not solve the problem of reveal the cause of the loop tenacious over. A thorough discussion to night suggested the idea that it might be due to the fact that the way the fresh loops are cut and carbonized the pith and outside of the Bamboo always comes on

the side of the loop, and to test the theory relative the pith side being more loose and porous than the rind, did not shrink more from the effects of the heat, than the rind form and compact related. It was determined to change a carbon forming mono so that the wadded ends might stand ~~perpendicular~~ ~~erect~~ at right angles with the face and thus bring the pith either on inside or outside of the loop. The mono was then arranged and a Calcium burner was and morning Mr Batchler got out thru or four had them put in carpo carbonized and heated very high and to the gratification of all the loops remained erect and they jointly felt that the problem is solved and that carbonization is now a fait accompli

Drank Mr Edison last Friday in New York an day in Coal Office. Worked hard in Pat. all day. Worked hard in mono

Carbon Forms. All the filaments used in mono as former or shapes for carbons are being changed by Andrews so as to hold the wadded ends so the thin edge of them will stand towards the face in the lamp. by which means the fibre will in every case be bent so that the inner or pith side of the fibre will come on the inside or outside of the loop instead of on the face as formerly.

Meters. Mr Edison wrote descriptions and made sketches of several new forms of electric meter in Book No 132, page 1 &c.

Urgent Visit at New Brunswick and pushed up the work recorded Book 136, pages 1 &c

Brazilian Lamps Lds.

Saturday Aug. 14.

Patents. Mr. Wilber took with him to Washington several Patent specifications and left with Mott for copy, the Specifications for Patent Electric Rail Road to be sent to foreign countries.

Furnaces. Mott sent to Woodbridge to order three Gas furnaces for carbonizing to be made with the square holes, for vent in the top of the lid instead of the side and to have two one with band one around the lid and one around the furnace. Goods promised to be delivered in 10 or 11 days.

Gas Apparatus. The gas apparatus at Lamp Factory not giving satisfaction and like now used at Laboratory was ordered in the mean time Patrick Clarke has small boiler there to further experiment on his machine by heating the water.

Aug. 14.

Work general for past weeks. Mr. Batchelor experimenting to determine the cause and devise means to prevent the long carbons from bending over sideways in the lamps, found the cause and remedied the defect by removing the causes. Mew under Logan setting the cast gear on the electric transmitter. Giving few experiments with the coal dust ~~experiments~~ furnace and experiments quite delay and annoyance by it. N. G. Setting the Horse and Gas supply at Lamp Factory, the former efficient but the latter has neither capacity nor simplicity for practical use there. Mew wrapping conductors with Manilla tarred and then comma with Manilla and again tarred. Mr. Wilber here several days at work on Patent Specification

Monday Aug 16.

Letter Yesterday Mr Edison made sketches of several different forms of holders and means connecting to lamp for measuring the electric current which were given to Mott from which to make Patent office drawings for Canada

Factory Bradley set men to work at work in the lamp factory, on Bamboo working its through the different stages preparatory to carbonization.

Coal dust. The engine is still running this morning on coal dust. and has improved somewhat through our experience of the tender. but the improvement does not warrant longer trials and at five o'clock the engine was stopped and men set at work removing the machinery from the boiler fire box and replacing the grates preparatory to return to old principle

Aunt Nunni at Philadelphia

Fruit in Vacuum. Mr Edison had Boston seal some fruit in a chamber arranged to exhaust on the pumps. in a couple attempts the fruit was injured by the heat but one pear was enclosed with slight injury and after exhaustion was hermetically sealed, and taken by Mr. Edison. I judge the experiment to be for purpose of testing or observing the action of the fruit when thus treated.

Bamboo Splitter Dean furnished a machine for splitting out Bamboo in which the knife is secured on a block of iron as a slide or carriage which block is then secured in a carriage frame and is driven down through the bamboo lengthwise by a treadle after which the knife is raised to its first position by a spring or weight and pulley. The bamboo is held in place on a base by two half ends blocks one concave and the other convex for the inside of the rattan bamboo for round or oval which blocks are held firmly against the material by a strong spring.

Lamp tests. Built a number of miscellaneous lamps were put at 32 candles up stairs in Laboratory, to test their staying qualities. the carbons were latter without regard to perfection and all those having spots went first. some of them lasting from to six hours.

Book No. 123 page 16.

Some of the old lamps made six or eight months ago and burned a long time last winter were examined for vacuum by a sparker, or induction coil and the ones sealed with white or annealing glass and those with common glass colended along the wires had retained much better vac. on the average than those plainly sealed through the ~~glass~~ thin glass.

One of the long bamboo carbons in a lamp No 1360 burned ~~over~~ after burning about two hours burned over till the carbon touched and blistered the glass but burned in

that condition about half an hour before the carbon broke.

Gas Apparatus. Mr. Edison had Prochnow make an apparatus for making gas and giving equal steady pressure to it which is composed of a bottomless bottle placed in an open jar in which a quantity of mercury is placed, and the bottomless bottle forced and weighted down therein. the gas is generated from sulphuric acid and zinc placed in a suitable reservoir and set in a hot sand dish from the generating reservoir the gas is conducted through a glass tube over top of jar down to and under bottom of bottle thence up to and above the surface of the mercury where it is set free in a pressure reservoir formed by the top of bottle at top and sides and the mercury at the bottom and made gas and air tight at top by a rubber stopper flooded with mer

through which by another glass tube and rubber hose attached it may be conducted where wanted, in the present case to a chamber for holding the damped carbon loops, which may be filled with the gas and the carbon heated by current either for test or for accumulating hydro carbon Patent Specs Vol. 65 page 1916.

Carbonization Cars Cars made the commencement of carbonizing in the Factory to day, and from first drawer of twelve carbon and former got out cleared in nice order, and from second drawer of fifteen carbons got 13 out successfully.

Bamboo straightening. Mr. Batchelor placed two split pieces of Bamboo, about ⅜ inch on an iron plate under 20 lb weight and burnt two ~~gas flo~~ burners flames under the plate to see whether the circular parts would flatten under the influence of the heat and pressure, but the Bamboo resisted all efforts

Visitors Herald Frd. here in evening

Glass. Two boxes of tubing from Corning N.Y. glass works received at Factory and upon test by Holzer pronounced very good glass for the purposes of the lamp.

Bamboo. First bundle of Bamboo were recd. this morning and cable prepared to send to Japan for a quantity of large Japanese bamboo.

To further experiment on straightening or flattening Bamboo Mr. Batchelor had some prepared same as yesterday and in addition to the weight and heat had the steam playing on it for a couple hours but without avail. His belief is that with very hot steam the bamboo might be softened sufficiently to yield to the pressure and be flattened.

Carbon Burnt bamboo strips were cut eight hundred thousand etc, and fitted in lamps so the thin edge round from the face of the loop, and to more effectually prevent their bending ~~[illegible]~~

Reuben. Mr. Edison sketch a modification of the Eglinton current reversing gage to make it applicable to each individual lamp in which it is used to shut on or cut off current and bring always burner one way; the current is reversed through the coils at each lighting-switcher was given to Mitch for careful drawings.

Absent Mr. Edison and Clarke left 7.35 train to Philadelphia and returned about three thirty.

Previous lot Ears brought some choice selected fruit to be cleared in vacuum.

Factory. Four young men set at glass blowing at Factory by Hodgins. Men commenced boarding up fence around lot. Mr. Clarke lit all the gas burners and burned them for forty minutes to test the capacity of the Edison gas apparatus. Mr. Tolver changing the form of the stands for gas and air for carborizing furnace, so that the main gas pipe takes the place of pipe between upper and lower burner to give more equal flow or supply to each.

Armature. The armature of the machine used for supplying current to the pumps in Laboratory, mysteriously gave out this morning and no external examination or test would reveal the point or cause.

Vice. Mr. Batchler desired and obtained a convenient little vice for holding and bending the wires after which they may have the threads cut and clamps secured thereon without removing or disfiguring.

Bolted in Book 102, page 78 &c. Now being made by one of the men in Shop

Lamp tests. The lamp completed Carbon-Weight, with a carbon of the usual length by 0.008 by 0.016 was tested by Francis at 10.66 candles Resistance 2.10 ohms. and 8.4 per horse power. At 32 candles 1.85 ohms Resist and 5.6 per horse power. Book No. 104, page 48.

Lumber. Wrote under to Mr. Lutchen to see Freeman in relation to fence lumber, that now delivered being very poor and to be returned and better quality delivered in stead.

Fresh in Vacuum for bot. Gauges, several packages examined and successively sealed up

Armature. Another armature was burned out this morning in the same machine that burned one yesterday.

Clamp Machine. Some of castings for the clamp machine have been received and Logan is turning the bars and some of the heavier parts.

Carbon tester. An old enlarged tube shaped for rubber corks and a mercury flooding arrangement was connected directly to one of the pumps thro' borrowing for testing the carbons, the inner tube is passed through the rubber stopper which is then flooded with mercury, the tube or cylinder is then exhausted and the carbon heated to note imperfections. It was found necessary to have tube and stopper connected to the chamber in order to let air in gradually after test otherwise the sudden influx of the air would break the carbon, tube and also cork put on but not tested

Aug 20.

Rail Road. Men cutting the grass and weeds from the track and putting the same in readiness for use of the steam locomotive

Research Dr. Moses still employed in Library. And for past few days Messrs Upton & Hammond have been in there at work on mapping New York City in Station Districts &c.

Visitors Sterling of Herald and a couple foreign foreign mining men with sample stones.

Locomotive. The new gear of the electric locomotive was run some little time this afternoon, to grind down and wear smooth before the test was finished an armature in station burned out, thus stopping the test on trial.

Silica dipped on carbons, with the appearance described Aug. 17. Dr. Hard has been today treating carbon in gas by heating with current the loop in the chamber through which the gas passes &c. did not get the good results of the experiment.

Work general for past week. Men cutting the gear in the electric locomotive. Jean drawing cutting stamps & forms for Backer strips. Andrews making carbon frames. Alt & Metzerger on call for pump indicator. Upton making calculations of the power, conductors necessary for a lighting station in New York. Hands working on Dynamo Machine Brk No 116. Mr Baldwin superintending starting the Camp Factory. Shorts Mr Edison went to Ashbury Park in afternoon.

Monday Aug. 22. 1880.

Dynamo Station. Several of the men worked all day yesterday and last night putting up the heavy shaft and large pulley for running the dynamo Station. This morning the large heavy bolting was received, and power shut down in the evening for the man sent here for the purpose, to make the splice.

Central station for Light &c. } Mr. Hoaring finished diagrams of a central station for light and power, fitted up with Porter Allen Dynamo. Engine.

Electric locomotive, as equipped with gear wheel & cruper was tried, the cruper did not work entirely satisfactorily but the difficulty was easily detected and can be readily remedied, by strengthening the springs that govern the eccentrics or gripping blocks and possibly attaching the lever back of the center of

shoe to obviate the tendency to lift up. The friction wheel however does not hold very well, would not hold sufficiently to carry the motor up the grade beyond the End, and heard no suggestions as to how the present wheel might be improved.

Armatures during the test of the locomotive, another and the fourth Armature was turned out in the same diagnosis so many armatures giving out in this new Machine would seem to indicate that the magnets in some way might be the cause or partial cause of it but that theory or suggestion does not seem to be entertained by those most familiar with the machine. One fact is observed in this machine that I have never known of in others, and have not been able to get an explanation of it and that is that a shock may be had by contact

between the base of the magnet and the commutator brush on holder.

Call on John Ott and McGuigan have completed and made several trials during the last few days of a cable box for the Ena indicator. In the Indicator the figures are thrown in position to read, ~~in the~~ the by telegraphic character and to simplify the operation so that any person unacquainted with telegraphy may signal. the box is an arrangement of three metal slides on each of which the necessary contacts for the characters representing the different chambers are ~~represented~~ formed by raised blocks ~~on parts thereof~~ and after each slide is adjusted to the numeral desired the contact is replaced made by a spring ~~which is~~ with a platina point which is drawn across the raised characters by a clock work

Visited Messrs Eldridge and a friend also Col. Samuand.

Pumps. Bochm. ~~connected a carbon tube~~ ~~chamber~~ made to a single drop tube pump without gauge. Also used to day for obtaining vacuum in fruit chamber. it works very well and the experience of the men in running the gauge pumps has enabled them to judge the vacuum very accurately by the appearance of the fall in drop tube.

Carbon tubes, still using the carbon tube on one of the pumps and is able to note very slight imperfections in the carbons and reject such as are unsuitable for lamps.

Shafts & Pulleys. The shafting for the Power Mercury pump was received at Lamp Factory together with some pulleys which were not the proper size and will cause some delay in being replaced or made to fit.

Fruit in Vacuum. Capt Comrand, having sent more Peaches here to day, the tops have been sealing them in vacuum for export with him.

Visited Mr Wilson

Aug 24.

First circuit. Late last night, it was discovered that some work was being wasted on the Dynamos. and by them indicating that the lines were crossed. The engine was stopped and examination and test showed the cross to have in some manner occurred in the wire leading from dynamos to the Rail Road Station which were cut between the branch Factory wires and the rails so as not to interfere with the power at Factory. the cause or point of the cross was not ascertained, but, their results, impress on me the importance of the utmost care and attention in properly insulating and protecting the wires used as conductors.

Power pump. at Lamp Factory having been reequipped with straight pulleys and connecting shaft was run empty some time to day.

Locomotive. the friction gear and shaft were taken out to improve if possible the friction of the slow speed clutch.

Ore washing Martin Force is building the experimental ore washing machine described under date July 20. and sketched in Book No 126, page 5.

Lamp Socket. Mr. Batchen assisted and sketched several forms or styles of sockets for lamps which may be found Book No 105 page 97 &c.

Patent copy. received for copy, the specifications for European Patent on the lamp its parts, and means and appliances for manufacturing the same, will comprise some 40 pages.

Visitors Prokes, Berlin, Wilber

Gas Machine. A large "Combination Gas Machine from Detroit Michigan was received at the Lamp Factory this A.M.

Pumps. Several of the pumps at Factory were found to have been broken probably by the contraction of the rubber tube leading from them to the mercury pipe above.

While and the pump boys are at work cleaning the mercury preparatory to starting the pumps. with other means of cleaning they are using a long tube say three feet formed with a dash crook or goose neck at the lower end the bend of which is filled with mercury and in the long straight part is placed sulphuric acid or any cleaning acid the mercury is then fed in the long tube by a drop or small stream and passes through the column of acid, which cleans in contact with and adding to

the bulk of the mercury in the bent part forces out an equal amount out of the other end of the tube, as will be seen this apparatus causes the divided mercury to pass through say two feet of acid. the greater weight of the mercury in the short goose neck part of tube supporting a much larger quantity of the lighter acid in the long portion of tube.

Nickel Lamps. Three lamps were completed in which ~~platinum~~ Nickel was used for lamps instead of platinum and they were found to answer fully as well as far as observations made during to day could determine.

Glass Blowing. Bochm with his table and apparatus was to day moved down to the factory to be employed on second floor thereof.

Building. Mr Eaton made sketch plan of a building to be erected 25 x 16 supplemental to the lamp factory for storage, packing office. Photometer Room &c.

Paper. Herald to day contains a letter from Pagh Higgs of Boston. replying to parts of Sawin's letter published in Same Paper Aug. 12. the whole being devoted to electric motors. of which he says he has transmitted 98 horse power three miles over a 7/8 in wire and shows by results of personal experiments and authentic published statements that Mr. Sawin is off - on electric motors

Clamping Carbons, Mr. Batchelor arrived and showed a device or instrument for clamping carbons which was given to Andrews to make sketch Books No 105 - page 107. A table or bed is provided with a movable or sliding part fitted to slide in grooves and is made to travel towards by a small shaft revolved by the fingers, on which is a small cog wheel fitting into a cogged or spurred strip screwed on the lower of the sliding table or carriage

On the movable portion of table the carbons may be placed simply on the flat surface thereof or guides may be made thereon in which to more securely hold the carbons. Near the table is a smaller adjustable rest on which by spring clamps the clamper may rest and be held, and after the table is moved back by the apparatus mentioned above the carbon shows will be inserted in the clamps and be secured by driving the screws with a suitable screw-driver.

Insulation. France is making some experiments for insulation of wires underground. the materials being tried mixture of tar paraffine, and various substances and gums in various mixtures and combinations.

Electro Motive force, Messrs Edison and Upton discussing ways, means and apparatus for determining the electro motive force or pressure in the several lines leading

Aug 27

from any central station and for distributing and equalizing the same. Mr. Edison made several sketches of devices and means to determine and regulate, which were marked "cancel" but I cannot or did not get them to determine the nature of their operation or give description.

Absent. Mr. Upton returned from visit to his family, to whom he was the graphically summoned on Monday last.

Segesser left for Florida and other points South to collect all fibrous woods, grasses, canes &c. that might be used or tried for lamp cartons.

Laboratory. Boys planing table and up stairs in Laboratory and giving that part a thorough housecleaning and cleaning.

Patent copy finished second copy of the 27 page (enlarged) application on the carbon and manner and means of manufacturing same and also a short specification for drilling - magnetic separator.

Conductors. Men and boys discontinued winding with muslin and shellac the conductors to street lamps leaving finished only a portion of the circuits (part of the 2d 25-arc circuit and the Edison line) that work was commenced on the 17 Sept and has engaged an average of about eight hands.

~~Mr. Kerr left for visit to wife~~

Work general of past week. Mr. Batchelor on the drawings and details of lamp machine. Dean with several assistants at work on same and on Bamboo cutters & splitters. Upton and Hammer on size length &c. of conductors for lighting station in New York. Clarke still on new form of armature adapted for large machines. Smith working to improve the effects of pendulum wheel of electric locomotive.

Tuesday Aug 31. 80

Building. Men digging foundation for a building north of Lamp Factory for tinning proving storage &c. of lamps.

Ground. The hole dug for the combination Gas machine is being filled up with soil, iron wire, tinnings, tin cans, scraps &c. with large iron running up through to form a ground connection for letting the power to or a durability of running the motor at Factory without a return wire.

Call Box. Mr. McKenzie and Johnson have finished a more complete call box for the Pond indicator which is working very satisfactory.

Dynamo Station. The large belt has been put on and part of the dynamos in station below and running, the wire to Factory having been connected to me so the power through a bright one of the machines in station

Insulation. A couple of the boys have been winding wires up stairs in laboratory with rubber cloth and taping the same for experiments on insulation, one bare wire tested in bath of water gave 100 ohms and after wrapping with rubber cloth gave 120 ohms, or 20 ohms difference. Not so good an insulation as was to be expected.

Visitors. Atkinson, Bergmann, Jones, Barton of Vacuum Electric, Pratt and Bailey.

Absent. Moss absent at home from Friday afternoon till this morning.

Wednesday Sept 1

Dynamos. Were belting and starting dynamos in Dynamo room, partition taken out of shop and pole put up back of station for supporting the wire for laboratory.

Papers New York Times today publishes a letter from Hiram M. Maxim pointing out and proving the fallacy of the deductions of W. E. Sawyer as published in his letter and not complimentary to Mr. Edison

Bamboo former. One of the heavy, hardened steel former on clamps for bamboo was completed by Dean and sent to the factory. made very heavy to avoid as danger of springing and temped to prevent decarburization by knife or hammer.

Patents. Drew copies of Specification for English patent No 16. subject of feeding to equalize and maintain electro motive force or pressure also for Magnetic separator

About Upton left for station home at 6.20

Fibre. A consignment of about 20 kinds of fibrous products, from Ceylon was received from Lyndon

Cores of the bamboo infusion in appearance was taken to factory for trial

Magnets. The magnets in which four or five consecutive successive armatures were burned out, were to day unwound and prepared for rewinding. The suggestion at the time that there might or must be some defect in the magnet that was the cause of destroying so many armatures, made by a Mr Coville was promptly set down as a mere fancy. But soon after a complete wreck had passed the magnet it discovered to have a crack with its base and that rewinding is necessary. Aug 23.

Lamp holder. Mr. Ott completed one of the lamp holders designed by Mr. Bachelor and shown in Book No. 165 page 99. The thumb

screw or circuit complete in this case, admits of turning on way only and the contact is made by the pin connected to the thumb piece, which by a spring is thrown in against a metallic ring fitted to inside of socket a tooth in the thumb piece drops into a notch in the sleeve of the shaft or pin, causing thus letting the pin come suddenly in contact with the ring & complete the circuit and the tooth and notch are so formed that on turning the thumb piece can be turned one way only and in so doing the circuit is suddenly and completely broken.

Ground. Another permanent and strong ground was put in near the Laboratory for experiments in working a ground circuit for lights and motor.

Mercury pumps. The mercury pumps on Friday were started this afternoon in the tube only and a very strong frame light and a vacuum formed in some of them very quickly but before any were heated the motor suddenly stopped and upon examination the armature of the magnet was both found to be crossed across the base, necessitating replacement with another machine.

Lamp socket. John Ott finished a somewhat different lamp socket to day in the former one the inside cup or socket was secured in the outer one by a screw on the bottom, in the one today the inner socket has projecting pins on each side of inner cup which fits under an single screw thread or inclined thus making the contact for one line and holding the inner cup in position

Conductor. A large pole was set up between the shop and laboratory as a support for the laboratory wire and bracket put on the pole leading to the factory for light wires to be run to there. And Mills running the wire and connecting the machines in the dynamo station.

Insulation. Franc tells about from foot of kiln wire in water, and found it run on main ohms, about same length of heavy bare insulated wire gave about 3600 ohms per.

Fuse Blocks. The moneys made by Drew which have been in use several days at the Factory having become partially clogged with dust mostly from rubbing the fingers over them, were brought up to be cleaned.

Visitors. The Mechanics of American District Tel. Co. with friends in charge of Dr. Kinzie

Papers. Herald to day contains another communication from Paget Higgs, replying to Sawyer on electric motor.

Motor. Dynamo taken from Station to the Factory for use in running the pump, after wires were connected and before the belt was put in the current crossed in some way (through the wires or possibly through the oily bottoms, some part of the hanging lamp stands. Duncan is making a great number of common plain lamp stands holders for holding the a gas cup is made a run through which the wires of the socket through be secured under springs which are connected to the circuit. The lamps can be very quickly placed or removed without any previous preparation, after which they may be placed in the commercial circuit.

Cable insulation. The experiments on the insulation for cable conductor are being continued with Mineline, rubber cloth, tarred gums etc. the full particulars of the insulation, material and thickness of insulation are in Book No. 104 page 75 &c.

Absent. Mott returned to night after an absence of two weeks on vacation.

Mr. Upton still absent, with his family.

Work general. Mr. Batchelor is detailed drawings of lamp Machine and Dean and assistance at work on same and on lamp forms for Bamboo. Smith remodelling the friction clutch wheel for electric car motor. Men digging foundations etc. for building and gas works at Lamp Factory and pumps there prepared for starting.

Motors. The dynamo taken to the Factory on Saturday was returned to day having found to be crossed both poles of magnet and also armature commutator with Fuse. The armature of the one brought up on Saturday was also found to be crossed with the shaft.

Gas Furnace. Three additional Gas Furnaces for carbonizing were delivered at Factory this morning. Now making in all five (all that provisions have been made for) three ready for use. Men also at work putting in the Consolidated Gas Generator.

Elec. H. S. Andrews is making in pursuance of sketch by Mr. Batchelor, a vice for holding and bending and holding lamp wire for tapping and having clamper put on, the present one is somewhat different in construction from the one now in use, but not sufficiently advanced to admit of a description.

Cast box during yesterday by Wright and instruction from Mr Kingsley John also made drawing of a cast box in which a wheel taken the place of the plain iron in the present box. he is to day making the wood pattern for casting for it. Tracing of the drawing was made by Mott and the original taken by Mr Kingsley.

Fibre - Another consignment of fibre ~~was~~ received to day from ~~Spanish~~ Spanish from Florida.

Visitors Prof. Rowland, Col. Eaton, Hanson & Fortune. - Mr Edison made selection of a number of styles and ways of running and insulating wires on gas chandelier dome dinner being filled to permit of the use of either electric or gas light without interference with each other.

Conductors. Wire for lights and carbon lighting were run to and into Factory to have current independent of the power circuit.

Factory addition. Masons commenced laying foundation for the stone and packing house supplementary to Lamp Factory. Coleman House about finished and occupied by him.

Clamping carbon, the ~~drawing~~ movable table machine for holding the clamps and introducing the carbon for clamping made by Andrews and described under date Aug 27. was set up and tried to day in Factory by Charlie Flammer he finds it very convenient and handy.

Dynamo. Forgings of soft iron for the magnet arms in pieces and top piece for the large 125 horse power dynamo were used. Another of the regular dynamos being the third machine, was taken to Factory to replace the one crossed, and to be used as pump motor.

Lamp. Stipple to day called my attention to a lamp he had made using a new style of enlargement on the inner tube and which after sealing together had remained are a day without cracking or checking and which had not been annealed. After heating the inner tube as if for blowing the small bulb or enlargement, he simply pulled the ends toward each other and the heated part is then made to project all around forming a thick bead on the tube. The globe part is then prepared for the inner tube by slightly thickening up at the point of sealing so that a thick and equally heavy glass are sealed together and the liability to crack lessened, and case in which the thin glass is annealed sealed with thicker glass, as in the former way of blowing a small globe on the inner tube then thinning the glass of inner tube which formed by sealed to the thicker glass of the outer globe

Insulation

Table No. 1. Rubber cloth, white, each strand overlapping about 1/8 width, Lama wire with coal tar boiled stiff, put on hot. 52 ohms

No. 2. Bare wire, No 10. 100 ft long. 127.

No. 2. Two thickness white rubber cloth each lamed with boiled coal tar, 57000 ohms full to 4850. 3200. 2600. 1500.

No. 3. Two thickness white rubber cloth wound in opposite directions. 77 ohms.

No. 4. Two Muslin each lamed with boiled coal tar, 120 ohms.

No. 5. 2 Muslin each served with hot linseed oil, 470 ohms 140 ohms 110 ohms.

No. 6. Muslin served wound on cable 1 thickness served with paraffine then black rubber cloth. thin Muslin again & paraffine 1200 ohms. 171. 120. v.

No. 7. Two Muslin each served with coal tar heated with quick lime to neutralize acid 720 ohms.

No. 8. Four wire untied with coal, paraffine 1 layer black rubber cloth, black rubber cement, then rubber cloth smoothed down

with black lead paraphine 12,500 ohms
7000 - 130 ohms.

No. 9. Same as No. 8 except rubber cement was replaced with hot paraffine. 9,700 ohms
3500 - 120 ohms

No. 10. Bare wire wound with white rubber cement, then white rubber cloth, then compound, No. 3. rubber cloth then rubber cement, then again rubber cloth and rubber cement, double with percepelatex cloth, 299,000 ohms. 1400.

No. 11. Same as ten except compound no 1 is used instead of compound No 3. 79,000 ohms

No. 12. Bare wire wound with Manila twine with compound No. 2. then Muslin soaked in linseed oil. then comp'd No. 2. thinned with cotton seed oil, then muslin, then lead, rubber cloth, then white rubber cement, then white rubber cloth 26,000 ohms 1000

No. 13. Bare wire wound with Manila cord & boiled in compound No. 3. then covered with rubber cloth not yet tested

compound No. 1. is Asphaltum pine tar cotton seed oil. No. 2. is rosin pine tar cotton seed oil. No. 3. Mineral pitch pine tar & cotton seed oil.

The above cables and compounds have been made and tested up to the evening of Sept. 8. by myself.

The number and manner of insulating and also the state of resistance or insulation was furnished by ~~Mr Wilson~~ from a private memorandum book. ~~and~~ the letter by Francis may be found in Book No. 137 page 103.

The tests of No. 1. and No. 0. show curious results and speak badly for insulation or testing. It is rather difficult to reconcile the records with a bare wire testing better than one with an insulation.

Contract may be obtained by request of Mr. Miller of Agreement F.A. Edison with Biderman et al. of Antigua and, giving them exclusive use of Patents relating to Light and Power System for that country for one half of the net profits, and guarantee from any liability or loss.

Pump Motor. The machine taken to Factory yesterday was set running on the pump but after a time suddenly stopped, and on the full current indicated a cross of the armature but no burning or unusual heating. The armature however tested all right with a battery current and the action was rather puzzling. They were led to examine into the cause of the up-stairs machine always going out and it was discovered that they were using or trying to use a .05 ohm armature there against a .53 ohm one down stairs and reasonably supposed that that had caused the difficulty.

Russell, Brott made Post Office drawings of a Lamp arranged with a screw of his own design, which can be turned only one way and each time that the lamp is turned on the current is reversed through the carbon or rod contrary to the way it has

Paper. To day Sun published an article description of the progress made by Mr Edison and the general introduction of the Light and power system and steps made for manufacturing the Lamp and of the perfection to which he has worked the system. but injudiciously fixes date of Oct. 1. for the practical demonstration into made here.

Station conductors. Messrs Eaton and Upton discussing the most ways of sketching the different methods and ways of running feeding conductors from Stations to the supply lines, to determine the most economical way of maintaining an equal pressure or electro motive force at all the lamps of the system. Sketches dated by self Sept. 9. 1880.

Pump Motor. Another machine with a .53 ohms armature was set at Factory and run for a part of the afternoon supplying the Lathe and one Englehart forty vacuum pumps, and being of the same resistance of the Hours much no perceptible fall

Sept 9

in spud a power was shown in the blower machine, when the other was put in the circuit.

Cutting moulds. Dean finished up another fiber cutting mould with an improvement by the addition of a knife on each end worked by a small lever and used to cut off the inside instead of using a fine hand saw for that purpose as has heretofore been done. The work may be done much quicker with this arrangement and do away with the saw dust which was likely to get in the stamp and prevent their proper working.

Absent. Mr. Upton returned to day having left town with his family since Aug. 28.

Several of the men are absent to day as Rev. Burnamb's in subpoena before the Grand Jury in case of Cornish.

Factory. Heavy beam secured on the roof to which to attach hoisting apparatus for handling the moulds.

Pump mould. The pump mould at Factory is working very satisfactorily to day and twenty seven good carbons were obtained out of thirty eight tested. No lamps yet put on the circuit of power pump taught several times stopping it suddenly and will have to be taken apart and remedied if possible.

Fixtures. Johnson procured a six light chandelier on which to experiment in satisfactorily fitting with connections, wires &c. for potato lighting the electric lamps and to arrange for use of both or either without any change in disfiguring appearance.

Patents. Made copy for English Patent Specification No. 15 on Subject of Dynamo or generator and motor for translating power into electricity and translating into power

Wiles. Patent of Chase

Saturday Sept 11. 80

Papers. Truth to day publishes the report of their reporter who was here yesterday and gives Mr. Edison credit of employing 100 men and accomplishing nothing.

Factory. New pump taken apart and brought to the shop to alter so as to prevent the chain from catching.

The new Car. Machine was floated from its place in the pit in consequence of water running in during the rain of the last couple days. Will have to be taken out and the pit pumped and again dug out. Van Etten to day put up shutters hoods and cast carbonizing furnace to conduct off the heat and gas.

Large Dynamo. Mr. Clarke finished the details and drawings for the large armature, and the main casting for base of magnet once received.

P.O. Drawing. Wott finished the Patent Office drawing for Dynamo, devised and described by Rowland in 1869 in which the polar extensions approach the armature from opposite sides and the wire only of the armature made to revolve, the iron core remaining stationary as nearly so.

Mail. General office week. Mr. Batchelor making efforts to get the Factory started, Messrs Edison, Upton and Hammer at work on conductors for electrification and plans for laying them. John Ott making bedplates and brass for Pond indicator. Dean working several men on fibre cutting models and on lamp machine. Carpenters fitting old glass house for Draughting room. Other carpenters at work on preliminary work of Supplementary Factory building. Johnson commenced on Shandelieb.

Monday Sept 13. 80

Large plant. A large Roraima plant delivered at Machine Shop to day.

Power Mercury Pump. Yesterday Cunningham and Smith prepared the mercury pump to assign the catching of the chain and it was put together today and has been running very satisfactorily.

Oil Milling. The rate machine for washing auriferous ores, after finishing by Man Force, and tried to day, but did not work up to expectations. Mr Edison sketched another device to be tried, on page 7 Book No 126, on a running off wooden principle.

Absent Mr Clark in Chicago to see Porter, Allen, Engine proprietor.

English Patents. Mr Weber getting up and stepping me at work on copies of European patents in Eight etc.

Tuesday Sept. 14

Patents. Made copy of Specifications for English Patent on Feeding conductor system; 12 pages; and a commencement copy of English Complete No 14. on Lamps, Carbons and Means & Methods for manufacturing the same, compiled from American cases Nos. 215, 229, 233, 210, 227, 220, 228, 216, 239, 219, 230 & 240.

Factory. Gas Machine taken out to pump and clean out the pit for resetting. Power Pump run till nearly noon and then again commenced catching and suddenly stopping, believed it will be necessary to again take it apart. The tubes with larger contractions were found to break by the weight & fall of the mercury, and a medium will have to be determined at which the pumps will stand and do the most effective work.

Lamp socket. Admiral electric a new socket which is designated as "Box socket" in Book No. 15 page 18a which is now being made by one of the new men in shop.

Visitors. Maj. Eaton here part of forenoon. Electric Dynamometer. Castings were received today said to be for electric Dynamometer.

Lamps. At factory Wendy for lamps were sent on the pumps, Order No. 2. 13. 17. 18. 25. Gotten off the other were almost ready to be sealed off when the power pump caught and stopped, and the vacuum was lost. The pump was again taken apart in the afternoon, and batteries to the ship to have alterations made to prevent if possible the catching.

Large Dynamo. Five castings for the large Dynamo were rec'd today and Logan turning and preparing the magnet cores, so he now has nine of the pieces.

Absent — Mr. Krouse went to New Brunswick
Visitors — this a.m.

Manager of British Cat office Museum with his wife here during afternoon and evening. Lord Stewart Wortley

Factory. Power Machine finish, had some alterations made in it this morning and put together and it running this afternoon very smoothly.

Planer. The large planer was gear up and run to night. A new chain and pulley lifting gear has been made for me at the planer.

Large Armature. Smith to day cut out of wood the facsimile of the copper strips that are intended to be wound on the large armature.

Patent. Finished copy of English Patent No. 2 which includes American Nos 210, 215, 216, 219, 220, 227, 228, 229, 230, 233, 239, 240, 241. Coming 58 pages and making 64 claims on Lamps & carbons and means and methods of manufacturing the same which was given to Hughes to carry to Lund.

Roller bearing. Gentleman here this morning with model of patent roller bearings, did not leave his name or any particulars more than this device.

Planer. The top piece for the magnets of new large dynamo come put on the new planer and started to draw them down, the machine run with too much main and it was stopped and the driving pulleys taken off to try to remedy the objection.

Sept 17, 80.

Factory. Power pump worked well all night, often it again caught and stopped, confirming the belief that it is unreliable, and Mr. Barrow proposes it be taken out and a lower pipe or vessel be substituted.

Call box. Mr finished a couple of the call boxes for Poole Indicator on telephone exchange, in which cylinders are used instead of the flat slides in the previous ones, are tried to be right. They worked a number very accurately and well.

Insulation. Howell finished cable last night which was put in a barrel of water (10 ft.) and this morning the bridge indicated no leakage by its inability to measure it, indicating it to have run one million ohms, see Saturday Sept 18 for the conclusion and manner of applying.

Saturday Sept 18. 1880

Work general past week. Experiments continued in insulating compounds. Mr. Batchelor working at Power Measuring Pumps at Factory, but unsuccessful in getting it to work reliably. Mr. Upton at work on Station Conductors. Smith on wooden facsimile of large automatic commutator connections. Logan on casting of large dynamo. Dean and assistant at planing machine and new furnace.

Insulation. See Sept. 8. No. 14. 7 strands No. 10 iron, 3 cores insulated with Maulen.

No. 15. 3 layer Maulen and reform compd.

No. 16. 3 cores white with dirt and boiled pine tar.

No. 17. Maulen, 3 compound No. 4. two layers thin Maulen and wrapper served over.

No. 18. 3 thickness muslin & Pine Tar.

No. 19. 3 layers Rubber cloth with two coatings of Compound No. 7. Done on return.

No 20. Same with Muslin instead of Rubber cloth, and two coatings of compound No. 7.

Compounds tried No. 1. Asphaltum Pine Tar & cotton seed oil.

No. 2. Rosin Pine Tar, & cotton seed oil.

No. 3. Black Asph Pine Tar + cotton seed oil

No 4 Pine tar, Venice Turpentine + Rubber Cement

No. 5. Oriziga Linseed oil, Asphaltum, Rubber Cement

No. 6. Oxid Linseed oil, Camphor & Asphaltum

No. 7. Oxid. Linseed oil, Pine tar, Asphaltum and Paraffine.

These data are taken from memoranda book of Howells.

The compd No. 7. was that used on the cable tested yesterday and has been adopted as the best for the purpose of the cable here

Absent. Prott absent since Saturday morning. Held this morning. Last night. Learn that Mr. Kiesse was in Philada yesterday to see about and order a screw pump for factory and Mr. Wade in New York to see high speed engine on exhibition at the American Institute Fair.

Tar Boiler received during my absence a portable furnace for stove and boiler on trestle for boiling and preparing the insulating composition for the lamp lines. Also received

Fixtures. Both of chandelier and globes of all styles and colors, to experiment on interior lines and decorations and different styles of fitting them with the electric lamps.

Vacuum Pumps. The long rubber leading from the pumps to the drain or tension pipes of power pumps were taken off today and in place of the rubber in the pipe were put long pieces of tube extending nearly to vacuum tube, and measuring lea into them by shorter rubber tube.

Gas Data. Prescott brought in one book the results of his canvass of four stocks for data on Gas, cost ~~power~~ etc. and matters important for the ~~before~~ change in a station in the city.

Pat Office drawings. Mr. finished a Pat Office drawings of a Kalliarca Motor arranged to change some of current when the Loss from one plate and accumulation on the other is sufficient to

turn the balance on scale, and which also at same time records each oscillation of the scale.

Conductor. Men today commenced preparing in larger quantities the insulation used on cable of mentioned on Friday and more fully described on date of Saturday, for insulating the light lines of Strut Lamps etc.

Addition. Men commenced small addition for shelter and protection to ha of the large tanks when in use.

Visitors. Left Armitage Gas Engineer who would not be convinced that the size of a piston rod depended for a certain amount of work per minute or second, did not depend on the speed nor that a rod which acts 10 times a second, would accomplish a certain work in a smaller time or with less wear than one which acts only once a second.

Conductor. Men commenced unreeling again (third time) the conductor trenches of South Pump. others preparing muslin with compound of Oxidized Linseed oil, Pine tar, Asphaltum and Paraffine. (No. 7.) with which to reveal the cable.

Insulation Hemp is continuing. experiments on an insulation for 10 days running for a substitute for Kerite.

Absent. Messrs Edison, Upton and Francis went to New York at 3 30 I hear to raise some Gas works. Mr. Batchelor also absent part of the day.

Visitors. Mr. Whitney of this Firm that sent gear for elec. locomotive also Proof of Indicator.

Arm Lock holders. Mr. Kruesi Molded and Arm Lock holder for Large Planer

Conductors. Fifteen men and boys were to day at work in insulating the South Pump conductor, by wrapping with 1/8 thickness of muslin saured with composition of Paraffine, tar Linseed oil and Asphaltum. And Martin Force changing Laboratory wire to the left and in rear aide.

Lower pump. Sommers was here and took with him the drawings of Lower pump from which to make the pattern.

Absent. Messrs Edison, Upton and Francis returned from New York late in afternoon. in their measurements of Gas jets they found the ordinary burner at usual burning, to give about 7 to the candle but from one burner in Bergmann's got 2 p. candle power. Note measurements in Book No. 160 page 5 etc.

Saturday Sept. 25 1880

Lamps Geo. Hill put ten Lamps on the pumps at the Factory this morning and got good vacuum, commenced sealing off and after getting off three the pump stopped "stuck" and vacuum in the other was lost, on examination the chain of the pump was found to be broken.

Glass. Four boxes of glass tubing was rec'd at Factory this morning.

Elec. Pen Press. received at Laboratory a Press for reproducing the work of the electric Pen. The Patentee drew up the after noon and received an order from Mr Edison for one of the presses.

Absent: Mr Lewis went to Philada. with pattern for the screw and to see Mr Mills & Sons about Murray pump. Also saw Porter Allen engine, thinks it will be finished in about four weeks.

Visitors. One of the examiners from the Patent Office, Frame of Mr Willen.

Work general fast work. Carpenters at work on building supplemental to Lamp Factory. Gang commenced this a.m. laying of first Lamp conductors insulating with composition. Large planer running on castings for Large Dynamo, John Ott finishing the cast iron Tower for Long incandescent lamp. and continued work on Commutator for Large Armature. Dean on Glass machine and Bamboo clamp formers.

Monday Sept. 27 80

Large Planer during yesterday Macone put brick foundation supports under the Large Planer, and removed the iron tops.

Manufactured lamps. Disp. to burnt date thirty seven or half good lamps in the proportion out of 100 filers. Are now getting out filer at rate of 550 ~~disposed~~ fibers per day.

Pump repaired and again running very successfully all day, and eighteen lamps sealed off.

Carbon Former. Forty three carbon former or niche moulds were sent to Factory to day, making enough on hand then to fill and keep three flasks running. Neal Van Cleve says he can now get out about 100 carbons per day.

Absent B. P. Mott went to house about five o'clock and to bed, sick with chills & malaria

Pumps. The pumps at Factory were visited this morning with twenty two lamps on, worked well all day and good success had in getting off lamps to 50 ~~lots~~ of which some sent up here for testing.

Contraction. Mr. Batchelor making measurements and observations on the pumps in relation to the contraction, to determine the proper size of tubing and proportion between contraction and tube that will give the best results in obtaining vacuum and the least liability to crack by the fall or heat of the mercury. Book 104 pg. 15.

Carbon Clamps. Andrews is making an instrument for holding and clamping carbons, similar to one described Aug 27. except that the table in the present machine is so arranged by an inclined plane that it is forward from the carbon at same time it is removed back from the clamps.

Sept 25

Office. Cornish at work in the Acme stairs office removing a portion of the partition and placing it length of the room to give more room in the office part at a sacrifice of the unused room in the front of office

Flat Sealing. Helga to day showed a new idea in sealing the wire through the inner tube of lamps, and was assisted by Mr Edison to make 100 lamps after the new style. After the wires are put through and secured in the inner tube in the usual manner, the tube is well heated all over and compressed again the wire making a long seal, the glass being reduced the length of the simple seal say 3/8 of an inch, by compression.

Heat Exp with 7 Some cloth covered copper
copper strips 1 piece strip 1/2 inches in diameter
were secured on the end of the armature of

the large dynamo in dynamo station, and was propelled by one of the regular machines connected up as a motor. Left to 240 Revolutions and running on half load in strong field 200 heats were generated. The third test at 300 Rev thirty minutes time 7° heat, and at fourth test 300 Revolutions and running one hour, the air temperature was 76° and temperature of the copper strips 88°. Book No 16 page 88.

Visitor, Bergman with a telephone also a Condenser found of Johnson and attache of Edison telephone Co

Elec. Pen Pics. The pens sent him on Saturday and shown off by the patentee were returned to him to day.

Papers. The New York "Sun" of to day states that a New Brush Electric Light Company has been organized and an office at 860 Broadway with intention of establishing a station in neighborhood of Union Square and claims to maintain forty lamps with current from one machine.

Call boxes. McKenzie completes and puts up two call boxes connected with telephones and working through the office, both worked admirably.

Organ. The maker of the Laboratory organ is here to day and giving the instrument a thorough overhauling and putting it in good repair.

Factory Lamps. Francis to day commenced testing the factory lamps, at 48 to 50 candles 18 of which were tested to day but not yet figured out. Book 117 pages 5 to 39.

Heat of copper rods. Further experiments were made to day on heat of copper rods received in a strong magnetic field. Book 116 page 89

Engine. The engine was altered to right in consequence of scarcity of water and will probably not run evenings until after a rain storm or a better supply of water is in some way obtained.

Combination Gas work All in position connected up and ready for the oil, the steam apparatus was started some to day and Angier took it down and made some alterations so that later in was working some between

Decorations. Boys putting different colored double wall insulator wire through some thin brass pipes or tubing for use on the chandeliers and any points where protection or concealment of the wire is desirable.

Arm tool holder. An arm extending about fifteen inches out from the upright of the tool holder on the big lathe was fitted up and prepared for screwing to the head block for use on the large planer as a tool holder.

Visitors Col. Eaton.

Tubing Some tubing received for experimenting on the proper size and method between the contractors and the lamp to give the best results in wiring also to determine the most economical size or the closest heating, the fall of from of the meeting.

Visitors Maj Eaton and a party of friends were shown through the factory by Mr. Ellison

A reporter of Worcester also here in after noon.

Arms Mr. Ellison went east in the afternoon

Angle plate Andrews is making a pattern for an angle plate for the large planer.

Carbon frames Mr. Foreign man next to Andrews to day commenced work on a very ad diagonal carbon frames moulds came as this now in use

Carbon Clamps Andrews commenced work on another carbon clamp on one for holding the clamps while the carbons are made.

Saturday Oct 2 80

Report Wood to day publishes an article attributing the delay in not making a demonstration here to the fact that the Porter Allen Engine does not come to time.

Absent Edison Batchelor and Johnson went to New York at 6 30

Mott went home sick with the chills

Max Conrad for 5 days work, Some of the men working on Large Dynamo, Dean and assistants on bamboo clamps and on clamp machine, Charles finishing up new drawing office, Factory turning out quite a number of lamps and Francis letting them, Upton and Hamming in Station consulting Mr Batchelor at Factory. Johnson at work on chandelier.

Wednesday Oct 6 80

Absent E P Mott returned this morning after absence at home since Saturday. Mr Upton also rec'd to day from visit home

Chandelier On Sunday Johnson put up the blocks and took card index for the chandelier up stairs in the Laboratory.

On Monday afternoon Pullman of the Parlor car Co was here to see about an electric motor for operating the transverse table for cars on which he has a patent. He has operated it by man power.

Carbon Vapor Mr Edison is to day making some further experiments with carbon in vapor of coal oil. the inside of the chamber was filled with folding carbon and the lamp augmented some. ~~further operations were to~~ The carbon was to be subjected to some further operations to complete the experiment

Combination Gas. Oil was placed in the combination Gas Machine this morning and it is to day supplying the gas for the factory, plenty good gas for all the demands of the factory. Pump. Pump worked all night and till ten o'clock this morning with the Pump and got it again ready for use, but it has not been running during the day.

Meter. Andrews finished a splendid made balance meter which was taken into the Laboratory for use in connection with his meter experiments & work.

Illumination. About one hundred lamps were lit up stairs in the Laboratory to night and a little part of the time at forty or fifty candles. They were run

all night and at four o'clock in the morning which two degm were left and extinguished.

Engine. Engineer California quit to day to seek his fortune in a Patent. Swanson was given his place at running the engine.

Visitors. Man here offering lamps for Lamp Factory.

Segredor returned from Florida on Friday

Thursday Oct. 7.

Tap box Andrew finished pattern for castings of Tap box or box to be used at all points where the main conductor will be tapped with other wires for home or other purposes.

Chandelier. The little Frenchman is making a chandelier basket after sketch and design by Johnson Book No 153 page 114 &c.

Conductors. The line leading from Edison line back his barn and to street near the gulley was wound and wound in the coil without boxing. And tested 3300 ohms.

Insulating Machine Mr. Henig is drawing and making drawings of a machine for filling piping with insulating material after the conductor have been placed therein in position.

Absent Mr Johnson [illegible]

Friday Oct. 8. 1880.

Patent. Made another copy of English Patent No. 4411 subject of feeding with extra separate conductors to equalize and maintain uniform pressure on lamp or translating circuit. 11 pages.

Prince Edison or Blake subject telephone evidence being taken here to day.

Inventor Meter. Bergmann has had and brought the clock work and mechanical part of the balance meter. The two trains three dials connected with the clock work which is moved or moved by the action of the current when the copper has been transferred from one plate to the other sufficient to cause the balance to move sufficiently to make an electrical connection to move the clockwork and dials pointer and current through the meter cup and receiver the copper until the balance again acts and so on during the entire lifetime of the solution and copper.

Chandelier. Mark Fan assisting Johnson
at cross in the Laboratory
in putting up chandelier and bracket
of vacuum designs fitted with wire insulation
in lead tubing.

Lamps. A number of lamps were sent up
from the factory to day in which the
sealing of the wires was effected by
first sealing a piece of fine drawn tubing
about one half an inch long to the wire
and then sealing the glass to the glass
of inner bulb, allowing the glass on the
wire to retain a pointy above and a pointy
below the plane of the small bulb thus
securing a longer seal with less liability
of a crack extending through sufficiently
to admit air.

Rubber cloth. Two packages of rubber cloth in
strips received for winding cables etc.

Interference. Edison vs Blake, a Dollar interference
on telephone evidence continued to day.

Gas Carriage. Mr. Russell brought to day the Rha
book of carriage on gas power etc. so far
has met with excellent results and
obtained the desired information in all cases
but one, that of a gas stove holder.

Gas box. McKenzie to day finished himself on
the entire completion of the gas box and
system in all its details, after nine weeks
labor.

Work Usual for past week. Factory has been
turning out and Francis testing a con-
siderable number of lamps. Work beginning
nicely on the large dynamo. Dean and
assistants also in lamp machine and
John cutting lamps. Gang at manufacturing
the steel armature. Carpenter on machine
work of Factory. Supplementary building.
Man (Moore) left for China and Japan

Conductors. Another pair were for lighting up lamps in the lamp room were run to Mark Fox from Slaton to the Laboratory.

Lamp. Holzer suggests a lamp which might be called pear shaped and to be received in that shape from the glass factory as being cheaper and fully as nice a design as the shape now used. The bulb would be divided and attached for sealing in the inner tube & carbon. Preparations are being made for signing and sealing about 100 of the factory lamps tonight.

Rubber lined pipe. A lot of three inch rubber lined iron pipe was received to day for experiment of insulating conductors therein.

Visitors. Frank McLaughlin has to day many received from California yesterday.

Building. Carpenters to day commenced work on a new building for black smith shop etc. 22 by 24 feet adjoining the old shop and carbon house.

Painting glass. A 3/8 in glass punch plate two by three feet for use on the apparatus for blue painting process was received and a man grinding off the edges.

Commutator. The casting for the commutator base or core for the large dynamo was received and Logan turning it up in the large lathe.

Lamps. 98 lamps of the second hundred from the lamp factory were started about three o'clock this morning burning at an estimate of forty eight candles and about twenty remained whole and burning up to six o'clock in the evening when the current was turned off and to-day the remaining lamps were tested for vacuum and resistance. Nos 171-173

Photometer. Furman furnishes a photometer apparatus for Mr. Batchelor to be used in supplemental building at Lamp Factory.

Pump. Again to day suddenly stopped with twenty two lamps on vacuum pumps healed and ready ready to seal off. several were destroyed and vacuum lost in all.

Gas. By mistake in putting ice in the wrong pipe of combination gas machine which been working badly so that the blower machine was again filled and had been supplying the gas for the Friday to day.

Lamp tests. The lamps that remained unbroken at six o'clock last evening that twenty in number were brought down stairs to be tested by Francis results not figured out. No comparison yet made and memory does not serve him to tell whether the resistance and economy of higher or lower were due were increased the higher

Water. The water for engine is very low and running might discontinued except on extra occasions.

Visitors. Gambli, Electrical Dept. of Western Union Telegraph Co. San Francisco and E. H. Anderson President of American Distinct Tel. Co. New York with a party of others.

Pear Shaped Lamp. One of the lamps with pear shaped globe was made by Folger and sent to Edison for this evening was burned awhile, generally conceded to be a better and finer style than the others now generally made.

Water. Man digging trench for pipe leading into the pond about two feet deeper to make complete drain.

Pear Shaped Globe. One frame containing one gross of pear shaped globes for Edison style of Lamp was used at Factory to day.

Pump. Mr. Edison trying experiment of using water in regular vacuum pump to see whether it would act in producing vacuum, it is a total failure.

Rotary Engine. New Rotary Engine Weil patent Manufactured by Leslie Ames was tried to night, the engine of six horse power and calculated to make seven hundred revolutions, run up to 810 Revolutions empty and with low resistance lamp & six ohms resistance reduces the revolutions to 680.

Gas Com. Mchn. Holzer refills the Carburetion Gas Machine properly and it is now working very nicely, whereas before the weight run down in 2 or 3 hours it now runs 24 and on.

Visitors. Mr. Baily Eng World.

Factory. Carpenter putting up partitions between the different departments down stair in the factory.

Papers. The point issue of the Scientific American of date Oct. 23.80. publishes letter and description of Maxim's incandescent lamp. Dynamo Machine and current regulator, claiming the Dynamo to be capable of heating to incandescence 80 feet of No. 9 iron wire and to have maintained 64 lamps of 50 candle power each, and as estimated by Maxim to be capable of maintaining 200 of his lamps. The regulator acts so accurately that in removing one by one of the lamps until but one remained, the regulator so varied the current to suit the conditions that no sensible difference could be

seen in the illuminating power of the last lamp or a single lamp at any time.

Patent on incandescent lamp granted Aug. 10. 1880. Process of manufacturing carbons July 20. 80. Dynamo Machine June 8. 80 regulator June 8. 80 and Process for charging the lamp with gasoline vapor Aug. 10. 1880.

Letters interview with Th. S. Edison Light Co.

Lamp case. A show case in first floor of Laboratory was filled with lamps and lit, which were lit at sixteen candles and allowed to burn all the time engine was running. The heat on the shade and wood work was very slight.

Water. Very low. Discussing laying pipes and pumping from Edison pond or brook down in gulley

Gas carbons. Frances Arranged an apparatus for heating carbons in gas a vapor of chloroform, ether etc.

Canvas. Mr. Risque to day sent out the Fourth ~~boss~~ canvas tent filled court data on gas point etc.

Pumps. The double lift of vacuum pumps supplied by power pumps were taken down and the supports set out from each other two inches on a side and the upper one turned about one inch.

Visitors. A New York Public Official said about to be a member of board of Aldermen.

Mr. Upton spent at 12 o'clock to Philada.

Wax gouge. Testing lamps by the quantity. Min on Large Dynamo. Gang of about twelve on Street conductor. Drawing assistants on clamp. Machine and clamp for cutting bamboo. Rotary engine received.

Belt Pump. A power pump to run by belt was received to day probably to be used for pumping water from and a brook and to be operated by electric motor.

Heater. A heater was also received for heating water for the boiler.

Meter. John Ott is changing the mechanical part of the balance meter so that when the rod or points connected with the balance shaft contact on the different sides it reverses the current through the a pair of magnets causing a rod or arm passing between them to be repelled or attracted and each movement of the arm by points on the whirm end propels a notchet wheel which in turn imparts the motion to the mechanism of the box and to the hands of the dials thus registering every vibration of the balance

Draughting Room. The building for the draughtsmen was finished up to-day and they moving in.

Visitors. Bergmann has and shown a resistance apparatus, probably for the purpose of trading some of them.

Absent. Edison at New York all day. Mann at Philadd and Upton at Princeton.

Bench Lamp. A Bench lamp was brought by Mr. Upton and burned until this morning but one than resistance in to relieve the machine of so near a short circuit.

Pump. Mr. Batchelor experimenting in pumps and continues at it nearly all night. Amongst the most successful experiments was one of sealing off the gas tube about six inches below the gauge connecting tube and passing the current through the short connecting tube and from the gauge tube, the contraction having been made smaller. On this pump a very good vacuum was obtained in about fifteen minutes by running about one and a half pounds of mercury per minute.

Lamp. One dozen inner parts of lamps made with three wires sealed through the glass, probably to use his carbons.

Chloroform Vapor. Frances heated some carbon in vapor of chloroform and also of Bi sulphide. the latter coated a little but the chloroform coated evenly and evenly carbon with opt put in lamps.

Visitor. Mr. Inman of Inman line of Steamers was well pleased with our and talks as if there was no question about their adopting the light on their new steamers.

Absent. Maj. McLaughlin said good bye for his return to California to night.

E. P. Mott absent in New Brunswick all day on abstract for Johnson Book 156 page 85 etc.

Steam pipe. A couple loads of steam pipes delivered at Lamp Factory for heating purposes.

Chlorine Gas. Frances trying some experiment on heating carbon in chlorine gas but unsuccessful in getting out any good specimens.

Resistance Box. finished yesterday and tested all night. It is composed of a lot of resistance spools screwed to under side of board, on small table on top is a crank which being turned from point to point throws in or out a fraction or a number of ohms as the case may be. at each full revolution of the crank it enters a notch in a wheel and turns it sufficiently to throw in or out several ohms. thus making so to speak a double resistance box.

Mica. A number of large sheets of mica receiving coat by Cunningham received on the car of the large commutator to insulate the strips from the core.

Wood shrinkage. Stimson is trying some strips of different woods in alcohol and rosin, to determine the best to use for cores, subject to the least change or liability to warp or check.

Visitors. Fabri and a party of friends.

Gasoline vapor. Francis secured a piece of gas pipe in one of the old buckle moulds, and introduced gasoline vapor after being well charged the moulds were placed in the furnace several of the first tests were unsuccessful from having been kept in too long and heated too much, giving the carbon a woolly appearance. Some of the tests later on, when the moulds were brought only to a red heat in the furnace, the carbon came out quite more smoothly.

Bush lamp. Mr. Upton making some experiments with lenses for the Bush lamp to concentrate the heat on the clamps of the Edison lamp during the process of obtaining vacuum to assist in expelling the air from the clamps by reason of the heat.

Pumps. Mr. Batchelor continuing experiments on pumps and sketch of one disposing with the fall tube given note for patent office drawing.

Oct. 21. 80

Ideas sketch. Mr. Edison sketch a new mode of attaching lamps to pumps and drying device one for heating in a chamber connected to the pump a large piece of carbon to measure some time using the moisture for heat. The other device being a chemical same similarly connected to pump. Two sketches of armatures, similar to the one the details of which was worked out by Clarke and one subject written now dated and signed by himself the other dated and witnessed by L. P. Stetts.

Disc Engine. Agent here and [illegible] nearly half an hour to get the [illegible] found it to be full of water [illegible] of stoppage in small pipe for [illegible] off the water.

Left L. K. Boehm left his position not consistent with his honor and that

Friday Oct. 22. 80

Arc lamp. The one result of the experiment with the Bush Arc Lamp Mr Upton and Martin Free are laid off to day with painfully sore eyes.

Meter. Current to two lamps is being passed through the balance meter connected to the box of recording disks made by Mr. Oct. 18. 1880.

Electric Gas. Experiments continued by Francis, no very favorable results. Book 104 page 175.

Water. Slight rain to day added a little water to the cistern and the pump was run till twelve o'clock for Mr B. to continue his experiments on the samples the best results so far have been with the gas tube cut off about six inches below the crow tube and flowing the mercury down the gauge tube to which is attached a brass or steel [illegible] [illegible]

Oct 22.

Absent Mr Kunz in New York all day.
Mr. Upton gone home.
Visitor. Telephone, man of Boston. Vail
Building Blake Smith shop finished.

Saturday Oct 22. 80

Statement. Made copy of Mr Edisons in
Interference Sawyer and Man v Edison
in which he states that he experimented
with paper carbons in 1876 and applied
a electric lamp in 1878.

Carriage. Mr Brinell hire to day and bought
the stock of gas & power carriage.

Patents Copy. Made copy of Provisional and
Final English application for Patents on
Automatic dynamo with Magnets electric
machines for Mr Edison & Johnson.

Armature. Mr. Edison made sketch of a
new form of armature composed of discs
and a core of iron plates or pieces which
was given to Mott from which to make
Patent office drawings.

Visitor. Burland the electrician and the
agent for Porte Boiler.

Work general for past week. Carpenters finished
Blake smith shop. Dean made a stack with
large armature. Mr. Batchelor experimenting on
pumps, lamps or connecting cable, & Mr Ott
at work on Meter. Diagnostics as in New Room.

Engine during military effect, gave the engine an overhauling and repaired both of them.

Pumps. Eighteen of the new form of pump with gauge tube, tested into the gauge tube drying furnace and spark gauge tube attached an up and down arrangement.

Drying furnace. the upper portion of a cylinder stove with perforated partition across therein for holding the lamps, through which air is intended to burn gas fed to them the moisture out of the lamps before being placed on the pumps was set up in the factory to day.

Bulletin. In Bottle No. 60. pages 1 to 5 Mr Edison to day made sketch of several forms of lamps, shapes and sizes of carbons and means for holding them in the lamp to exclude the air & protection.

Carbons. Mr Edison and Francis are to day experimenting on baking up and making carbons more homogeneous. Paper was soaked in tar and placed in moulds. Naphthaline gas was passed through the moulds while in the furnace. The paper carbonized hard, smooth, very homogeneous with a ring like a piece of steel. A loop was then put on a platinum and naphthaline well connected with gauge tube, after passing the burners for a time to remove a portion of the air and permit the gas to flow in the loop was carefully heated by the current, but at first gave very appearance of avidization and was exceedingly irregular. after running the pump for a few minutes longer, the current was again applied and the loop gradually turned up and soon gave appearance of being entirely vacuum the inside of the globe was known as coarse

Oct 25

The carbon was removed by Mr. Edison and found to be nicely coated and of good appearance under the microscope and more tough or tenacious than the ordinary carbon. Several trials were then made of passing the Naphtaline through the incrusted, in the furnace in which was placed Bamboo strips &c. but with indifferent and varying results.

Water, Gimlets taken in the gallery and three needed for dynamo motor and pump for pumping water for the engine.

Visitors Bailey of Boston and Baby Mayo Edison and two gents on business in morning.

Tuesday Oct 26. 80

Heat at Factory. Pipe fitters are putting in steam heating pipes at Factory.

Carbons. Mr. Edison and Francis continuing experiments in coating carbons in Naphtaline gas with fair results and little success except the explosion which they had prepared for by placing the lamp in a box. See notes in Book No. 104 pages 178 etc.

Reflectors. Two packages from the United States Reflector Co. opened and in early morning some interesting trials made on the electric lamp with them and with some of them very fine results were obtained in reflecting and concentrating the light.

Absent. Mr. Batchelor and Kruesi absent all day at Philada. report that the pump is now underway and a promise that it

will be shipped on Wednesday Nov 5th.
so encouraging reports from the Engineer
but we have the tea plate in time to
facilitate matters here and obviate any
delay on the dynamo part.

Switch board: Mr McRae informs me that
as telephone switch boards are of recent
construction normally all lines are plugged
on ground bar, necessitating ground
plugs to be withdrawn from both lines
and being inserted in the blank bar
and that he has devised and adopted
means whereby this may be accomplished
by the withdrawal and insertion of but
one plug, by means of extra connection
on the back of the board.

Gas Mouse. Mr. Andrews furnished a new drawing
design by Mr. Batchelor for placing inside
the large kiche mouse, the frame has
a perforate bottom, and a light frame
and the large iron pipes on top slightly
reduced each one capable of holding ten
cartons or loops. A short piece of common
pipe is secured in the bottom of the mouse
through which sanigenic gas may be
introduced in to the mouse and pass
through the perforate bottom of the frame
and being there diffused and passed
evenly around the loops after which it
escapes through an opening in the
top of the frame, the object being to pass
gas or vapor of any kind through the
mouse during carbonization or by retarding
after the loops in the above design appears
the after the with gas or vapor passing
through, after the primary carbonization

Armature. Dean commenced laying out the heads of the armature on the cast iron plates prepared area for the steam

Lamp tests. Francis tested 40 lamps that were not sealed off. The pumps resist. No spark could be seen in the spark gauge of the pumps with a 3/16 air.

Conductors line was run from station to draughting, inquiring for light.

Factory. The chain pump was unused today for the carbon tests and about 28 carbons tested.

Sequence. Dispatch received to day announcing the death in Adrianople from yellow fever.

Bath tubs. Dean commenced a cutting mould same principle as the ones in use but smaller in which Bath tubs may be moulded.

Water Main. Putting up open trough from the Boiler to an a superior elevation over pulley, in which water may be pumped and run into the Boiler.

Instruments. Ordnance is being taken in the office in the case of Heath & Brush & Eaton according to Carson, and Blake & Wilson according to Batchen.

Cable. The 25 mm cable & its branches and Mr Edison's line & branches are again insulated and ready for the lamps as soon as informed by Strong.

Indicator. Mr Clark indicated the Engine this morning with shaft running as usual but the dynamo machine all open and found 10 H.P. was being taken for other & shafting

Shade holder. The little Frenchman finished a shade holder for Simon composed of three arms with spurred ends and hinged at top to a fancy ornamental piece suitable to hold the socket of the lamp. Below the top piece the arms are encircled with a ring which may be moved down on part of the arms which is made with a slight incline thus binding the arms towards each other and the spur under the flange of the shade, making a very neat and convenient affair.

Tests to day Mr. Batchelor church this evenge of doing away with the combination of the tubes with the pump direct and permanently by treating the lifting globe as a separate vessel and placing it on any regular pump as a lamp. It may then be removed & the carbon put in and taken out by one man at his bench and there would be much danger of leakage both of gases and carbons.

Gasoline vapor. Franklin is still experimenting on heating carbon in vapor in the testing apparatus. He today using gasoline and got off some few mg. fine appearing carbon. Mr. Edison and I have put in lamps for testing.

Water Dynamo taken to gulley for pump motor for pumping water for Engine.

Visitors. Maj Eaton. also Wilke stopped a few minutes on way to Washington.

Mint blank sent to him this a.m.

Sparks Station Mason wrapping between the walls and floor beams and cementing the space to stiffen the floor.

Large Armature. The long copper strips were received to day for the large armature.

Work general last week experimenting & experiments on heating carbons in gases. Dean with assistants working on large armature and on mould for cutting fast fibre. Gang still on insulating armature. John Ott finished wire mill. Mr Carpenter running steam piping at factory for heating purposes. Mr Batchelor experimenting on and having pumps changed to put on table with dyer and spark gauge attachment. Men at work preparing to pump water from gutter.

Regulation Sketches & Apparatus for regulating electric motion given by Mr Edison Book 60 pp 12 etc.

Street Lamps. On Monday night several lamps were put on line past Mr Edison's barn and left up, and on Tuesday night the entire line along turnpike from Menlo to Factory was supplied with lamps to Menlo Mill nearly 12 o'clock. Burbank was here with stereoptican and tried it with the electric light, good but not quite powerful enough.

Visitors. Bidamman of Geneva with an introduction on Monday. Burbank on Tuesday.

Vulcanized fibre. Bradley succeeded in cutting out a few strips from Vulcanized fibre in the form sent for Bamboo, which were given to Mr Batchelor and as soon as a mould can be cut, they will be carbonized and tried.

The Cylinder Engine. A German patent the cylinder engine was received to day, small probably 5 or 6 horse power. Not yet tried.

Motor and Meter. Sketches dated on Sunday made by Mr Edison Book 60 pp 18 etc and also date Nov 2. pp 45 & 46. same book

Water pump. The motor taken to the pulley for running the pump across with the bar and was returned to the shop. An armature with pulley was put on the locomotive and run down yesterday pump connected and raised water to the troughs, which were found to leak so that they were taken to Mr. Lee and to day the pump was permanently set to work and is flowing into the pond a stream estimated about 10 gals per Mr. Telephone Station. The telephone station up stairs in the Laboratory was completed to day connecting all the instruments in the park in a regular system.

Absent E. P. Mott, absent all Friday afternoon, Saturday afternoon, also Friday night.

Gasoline Carbon. Six carbons treated in gasolene gas were taken to Mr. Seeley to be put in Lamps. Two put in acid with were wrenched and broken by Francis before any test could be made on them solid.

Visitors. Budeman in company with mister Hon. Genova, member of rock Island Block Berlin agent. Mr. Painter. Senator McKean and lady Carriage.

Absent. Hodges sent to Corning N.Y. to see about getting some Bar Diapia and globes.

Gasoline carbon tetanic of which carbon returned from factory in Camp. this morning part of which were exhausted in a bottle in the Laboratory on Nov 16 candle took 3225 ft. the Book No. 121 page 116. Mr. Edison tried carbonizing the raw tamboo in a hot glass tube having gasoline vapor passing through it, but it burned a failure. he and Francis worked very late on ~~carbon~~ treating carbons and carbonizing in the furnace with acetic mixed and gasoline with varying success.

Balance Mtr. Arbor Ax finished a balance meter in which the plates of copper suspended from the main are each immersed in separate rubber jars. it was set up for test in the photometer room.

Rubber lined pipe another lot of rubber lined pipe for conductors was rec'd to day

Paints. Mott succeeded in making some very good paints by the blue process, by using the original patent office drawing and giving it a five days exposure this means would save the expense and labor of making tracings for that purpose.

Large Globe. The large globe were to day carried into the back machine shop and cleaned and the extra one was taken in the shop and fitted to the post by Mr. Grant.

Indian department. Mr. Commander cleaning and painting interior of the Laboratory & all things removed from the shelves and cleaned, and dusted preparatory for the painters.

Absent. Mr. Batchelor at his home all day failing continually under the weather.

Canvass. Pardee delivered another lot of canvass for gas etc.

Rio Cenis Bambo. sample of Rio Cenis Bambo. was sent to day. large, cream and green

Armature core. Logan is running lignum vitae core for the large Armature

Pona pump. The pump in gulley pumped into the Pona to day one & one half inches perpendicular rain in six hours.

Reid Mr. Clarke returned to day, after an absence since Oct 29.

Work general for past week. Elphinstone Hammer fabricating the electric Hammer for Mr Russell carriage. Edison & Bernstein testing carbons in gasses, commenced putting out the Street lamps. Dean & assistants on Armature. Cunningham in Commutator for same. Otto on Mullin. Several men in shop on Magnets &c of large dynamo.

Work. Engine running and part of the men at work in shop. The pump too at Factory also working the pumps, half day in the afternoon.

Water leaks. Sometime during last night the heavy wind blew down the whole length of open trough erected to conduct the water from iron side of pump to the pond.

Carbonization Mr. Bachelor is making some experiments in carbonizing Bast, Bambo and Manila hemp in the furnace in the laboratory, but with but partial success, several of the tubes melted on the inside and running the products. Mr. Edison had some iron pipes made with four wires and clamps two of which clamped the ends and the other two about 1/4 of an inch up the carbon for experiments in holding up the carbon between the clamps to make good and for permanent

clamping the point on that was
arranged so that the two ends were
in multiple arc and on being of
little larger than the other and consequently
higher resistance they did not heat and
accumulate in the glycerine vapor tube
and he directed the wires to be run in
such manner that the ends desired for
augmentation would be in line after that
better results were obtained. Some carbons
thus clamped were heated immersed in
turpentine oil and one placed in a lamp
late during the night. Several stopping
up and wooding in the subject all night.
The incandescent filament carbons did not
pass well through the latter therefore
not of its proving satisfactory. They have
not yet been put in lamps but office
work and are strong and healthy.
Rice Hogue returned in midnight train last
night carrying with him a lot of glass
for fair tubes of pumps

Tests Lamps. Arc lamps complete arc with
carbon made with upright coming were
issued by Francis but provisional "no gores
~~the fault known probably lying in the~~
~~body of the carbon and said to be immaterial~~
~~without test on that point~~ Dr. also tested the
lamps sent from Factory as having been
exhausted yesterday. Apparent Bach filament
was heated in the arc only and part in
a lamp sufficient current was put on
to melt the copper wires leading thereto
but without any perceptible injury to the
carbon it was then taken out and replaced
in another lamp. The lamp just described
in which not ~~is some other~~ was from in-
formation received from Francis while
testing but later on inquiring the when
bout of the second lamp including the second
Bach he acknowledges that to have been the
lamp containing the tube
lamp. and that he does not know when
he broke the results of the tests report is
apparently taking for his volume information

Monday Nov. 8. 80

Interference. Evidence being taken further today on the telephone interference designated by Mr. Bachelder as the formal telephone interference.

Dynamo bearings. One of the machines in dynamo room - near the change of change belts in the bearing to see hot and smoking the hair bearing so that it was necessary to remove the armature the bearing remaining on the shaft. Schnapdie was relieved of his charge and given liberty to seek pastures new.

Illumination. Mr. Edison's house having been supplied with new wires, it was again illuminated into the electric light.

Tuesday Nov. 9. 1880

Interference Evidence on telephone interference being continued to day.

Water. The leaders which were thrown down the other night, were repaired and replaced and the pump again set running to fill the ponds.

Wednesday Nov. 10. 1880

Rambo. Japanese bamboo about one ton was received today but very damp and mouldy. A lot of apparently good fine grain near outside.

Interference evidence slips being taken.

Building carbon ends. Armature finished as clamping holders for securing the ends of carbons so that the current may pass in at one end, thence along the carbon to the second clamp, thence across to the end and out at the point on other end. The establishment of a [illegible] to

Nov. 10

clamps on each side each of which are impinging against the underlying carbon by small thumb screws, in which position it is in readiness to receive the treatment in oxygen or similar liquid.

Thursday Nov. 11

Evidence continued and Mr. Batchelor and Mart Foci searching for the original iron transmitter.

Friday Nov. 12. 80

Evidence continued.

Balance Meter. Nichols experimenting on the balance meter and is exceedingly well pleased with its accuracy and prompt action.

Dull. The heads are now have been during the week almost exclusively engaged in the Sulphuric case and no experiments have been run on dynamo plant.

Heater clamp. Atkinson set up the arc lamp in the dynamo room and by his reflector focussed the heat through on a clamp in open air and very readily heated it red hot.

Bed Plate. The bed plate of the Porter Allen Engine and large dynamo weighing 8400 pounds was delivered at the depot to day.

Bunsen. A small engine and boiler sent here by Bunsen to determine whether it would run on of the smallest dynamos with sufficient power to produce good light for his steroptican, was set up in the laboratory and run under one hundred pounds steam pressure, the small dynamo was attached but seemed the speed very much when work was given it.

Watt General of Hartford, Mass. Baldwin & Edwards engineers in charge of Sulphuric case, Gill being at Philadelphia in consequence of delay in getting the semi-comp. Men in shop pushing work on large dynamo & armature. Also at work on an Electric dynamometer.

Two Mass. Auburn finishing a Two Mass made and to exchange 10 & 12 carbons at a time. The other is now [illegible]

Water heater. The heater for the Porter water was set up in position to day and put in run about dinner in evening at which time the fires were started.

Room. The top of ~~small~~ door leading from Machine shop to dynamo room was enlarged and arched probably to make room for better handling heavy machinery.

Carbonization. Andrews filled the new mould with straight fibre getting 1 lb. neatly. Late Francis started fire in furnace but in handling the mould shook up and did the weights about so that the carbons were of no use, crooked and misshapen.

Gaidner Engine. The three cylinder Gaidner Eng was run empty about 2 hrs very quietly and smoothly.

Visitors. Mr. Wilber and family, also a Mining Man, whose name could not learn.

Bed plate. The bed plate for the Porter Allen Engine and dynamo was brought from the depot and gotten safely in the machine shop.

Hot clamp. Acheson to day focused the arc lamp on one of the Edison Lamps sealed in the vacuum and heated it to red. But about that time the glass melted and the atmospheric pressure forced it in making a hole through the globe.

E. E. Co. The directors of the Edison Electric Light Co. held a meeting here this evening.

Visitors. Reporter of New York Herald and some other gentlemen interested in the Light Co. and curious over the progress of Edison and the United States Electric Light Co.

Bast fibre. A load of fine Bast fibre was received at the Factory today.

Meter. Nichols to day runs the meter with us and found it to work faster afterwards by steam heated the water surrounding the cups and the resistance in the action of the meter was the result he got the error by the thermometer & he can by proper resistance at the different temperatures make the action uniform.

Carbons. Mr. Edison and Upton are testing the resistance of some Bast and Bambo carbons that have not been subjected to heat in the lamps. varies from 450 up to 2000. Book No. 106 pge 63 &c.

Heat Factory. The plumbers set up the boiler and turned steam into the pipes at the Factory today.

Telegraph. The Western Union wires were to day changed from the office to front upstairs Laboratory.

Man Power. The large crank which was put up in the dynamo room and belted to the dynamo machine with small pulley used for pump current, one man at the crank let four small lamps and the Brush Arc Lamp.

Rita. Mr. Upton returned after an absence since Saturday, family rest with him.

Before Sun and the papers of to day give some extracts of a lecture delivered by Prof. Morton in which he claims greater economy and stability for the Maxim Lamp than the Edison. For remonstrates the superior efficiency of the Edison generator over all others. The Boston Journal of Nov. 10. brought by Mr. Upton yesterday contains a lengthy and fair supplemental article on the works &c. of Mr. Edison. Last of this week takes off the light with tallow candles and the rail road with a hand car driven by steam power.

Engine foundation Men are removing the soil from under the end of engine room for laying a solid foundation for the Porter Allen engine and dynamo.

Bast fibre Hering is experimenting on Bast fibre in acids and various solutions to soften & remove gum &c without damage to the fibre. Work 125 Rue 7 etc.

Light wire. Cable were to day removed & entrenched in the Laboratory lot for the lamp posts and also run through under the rail road near depot and four of the large posts & poles set in place.

Bottle. A box of wooden lamp corks and base screw etc for finishing them were rec'd to day.

Weight of the six carbons which were carbonized carbonized in 15 minutes with a equal number that were heated very slowly and both shown in carbonization were weighed carefully and it was found that those carbonized quickly lost about 12 pct. or more carbon than those slowly heated indicating that the tissue carbonized by quick heat are more porous and liable to internal burning than the more homogeneous one treated by slow heat.

Bast carbons. Some carefully made lamps with Bast carbons were tested and gave about 142 ohms at 16c. and were very wen in economy. Book 124 page 15 etc. The lamps were set burning in the case in Laboratory at about 16 candles.

Papers. Herald to day publishes an article on the Mason Lamp together with an interview with Mr. Edison on the subject [illegible]

Fiber. A package of dark fine strong hairy appearing fiber was received today from New York has been tried before, but want to give it a more thorough test.

Building carbons. Having connected evaporating tube with pump in lieu place gave and sulphuric acid and tried it on the carbon in a lamp, but was unsuccessful in desirable results. Built up with gasoline (Christiania) and burned at 30 candles about one hour raised to an estimated power of 350 c. Carbon 1 1/2 minutes Book No. 125, pg 3. etc

Papers. The Scientific American of this week date of Nov. 17. contains very good article on the progress made in increasing lighting and very justly gives Mr. Edison the credit of being the pioneer in that branch of lighting and rather ridicules the both said to be taken by many scientific men and particularly English Papers.

Elec. Dynamometer. John Cox finished the Electric Dynamometer on which he has been at work for some time and delivered it in the Laboratory.

Engine Foundation. The floor of the engine room was removed the shape of the bed plate of the Porter Allen engine in a ship about six inches wide and Brasme wire wove all bright on the foundation walls.

Iodine & Naphthaline. Some Iodine was put in a Naphthaline lamp and after exhaustion evaporated by heating the carbon. The vapor however attacked and destroyed the carbon near the lamp. pronounced so good. Later in evening Naphthaline and the chrystals of Naphthaline were tried, the chrystals giving a smoother and more perfect coating and binding.

Mercury. In the experiments on the pump and lamps at the Factory last night the working of the mercury indicated impurities and on carefull examination it was found to contain quite quantities of Plaster Paris which had been used as a drier in cleaning. Salt is now again used and found to be a much more satisfactory drying element to use in the process of cleaning.

Street cable. The cable to street lamps except about 1000 feet, again varnished and reel and bottom of shelter piled up. Finishing all work on the lines for present. The last winding and insulation was commenced Sept 23d and has employed an average of about twelve men on the work ever since.

Papers. Prof. Morton published a card in the Sun to the effect that their report of his lecture published on Nov 7th was a mass of errors or misrepresentations by their reporter, but does not state in what particular it is incorrect.

Large dynamo. The polar extensions of the magnets of Large dynamo were placed on the Large Lathe, preparatory to boring out the holes.

Spark Keys. The single point spark keys used on the pumps were found to deteriorate rapidly in consequence of the spark at single

contact point. Mr. Batchen in consequence is having Charley Flammer make a lot with double points to replace those now used.

Hot Mercury. Mr. Batchen had taper fitted in an iron bottle in which Mercury is transported and secured it so as to have a gas jet under it and heat the Mercury to 88 or 90 degrees. The plan was found to give much quicker and perfect vacuum and improve the general working of the Mercury.

Wax general pack work. Bed plate for Dynamo Engine placed in shop and some preliminary fitting of the parts effected. Discussed with the Armature shaft, and work on the commutator etc. progressing satisfactorily under Dean. Discussed Carbon & Batchen experimenting at factory on times for subjecting filter to process of carbonization, on length of time and heat to apply to lamp on pumps, and on heating Mercury and pumps. Mr. Black working on the relation and laws of motion to machine etc. Adhesion on above

Carbon by Batchen

Monday Nov 22. 80

Facing. during yesterday were used at one
all day at the facing putting up facing
and spark irons and putting iron strap
costs in all the 17 pipes leading to
the pumps.

Carbonizing mould. Andrew finished putting
a carbonizing mould with a round
piece secured in the one end of the plate
and small weights to be secured on the
ends of the film the plate of mould is
then rivetted to secured upright at the
bottom piece of the frame and the film
fall around the round piece and
hang down with weights secured thereto.
was tried last night by Mr. Belcher.
but he found an alteration necessary in
the weights by which they slightly bend
the ends and prevent the weights slipping
off by the shrinkage of the carbon.

Engine. fresh packing was put in the cylinder of
the engine yesterday by Alfred but so
heated this morning that some delay was
caused by stopping to cool it.

Back eye. Mr. Clark is at work on the
details and preparations of a dynamo
for a back eye engine to run at 450 Revs
which he intends use is being made
for the test of lead pipe. B116 0 121 ds

Electroplate. Acheson is making some
deposit experiments to get a carbon
deposit by electrolysis. although he has
obtained slight deposits nothing
definite or positive has been obtained
to warrant hope of success.

Magnetism of Pipes. Upton and Clark made
some an experiment to determine
whether the pipe plate or bed on the
large dynamo could be dispensed with,
three small bars of iron were secured
against the polar extensions and the
pipe or cross piece on top of the poles and
the galvanometer indicated a decrease
of six volts in the current due to the
presence and contact of the bar

Papers. Herald has a short notice among the foreign items of the fact that the original or first Edison incandescent lamp is now exhibited in the Patent Museum at South Kensington. (Given by Mr. Edison & Col Stewart Menzies Manager, at time of his visit here Sept 15.)

Annalus. One of the machines made for heating glass preparatory to blowing into globes (described May 28) now applied to annealing the outside coat of the lamps and is a very satisfactory apparatus for that purpose.

Hiab. The boiler at Factory was inoperative in its production of steam, and to say a blast pipe was connected with the fire box. The blast raised the steam up very quickly but took too much air from the blaze of the glass furnace, the fire hole will probably be reduced to a constant one half or an inch supply instead of five or six inch, the present pipe cause-

Papers. The Evening Post of yesterday published a Reporter's Interview with Prof Barker in which the Prof. says that Edison's lamp is twenty years old, and that Maxim has found and now has what Edison has been looking for during two years past. (For consistency see paper of March 25. Also only herein March 26.)

Annalus. Dean tried saw for cutting with the large copper discs into proper strips etc. on the small planes but found it not sufficiently solid and is now preparing to arrange it on the lathe used in cutting the pen holders. Maj Wilber has with an assistant from his office both at work in absence from some thirty cases of which the drawings have been prepared for by Mr. Ott and are awaiting the attention of the Major

High Vacuum. Last night six Bantro lamps were sent to the Laboratory for experiments on high vacuum. Two were exhausted during the night by the pump here and burned about three hours before sealing off. It was observed that the effects thus could be produced at the clamp, even when burning at low heat by holding a magnet near the glass and that as the vacuum improved the magnet required to be brought in closer proximity with the clamp to reproduce the effect. And the lamps were left on the pump until no effuvescence could be produced by the aid of a strong magnet. They were tested by Francis and found very economical and were perfect in appearance.

Belt strain Mr. Clarke in his investigations of the relations between generator and motor establishes or rather discovers the fact that in machines of the same constitution the strain of the belt driving the dynamo and

the strain on the belt from the motor to the driven machine will be the same, when doing their maximum work, regardless of the speed or internal resistance or loss on the lines.

Chemically treated carbons. Friction carbons were treated chemically by Dr. Haid to remove all organic and foreign matter. Comparatively a small amount of impurities were found yet enough to possibly be deleterious. The carbons were then sent to the factory to be measured and those of suitable variance sealed in lamps to be returned to the Laboratory for exhaustion and test.

Condenser in Lamp. Hammer made small condenser of alternate sheets of mica and foil connected with wires of lamp below the clamps, sent to factory to be put in and exhausted.

Visitors. Reporter of Tribune, shown arma and explanation given him by Mr. Edison.
Also Bridgman & Puma.

Thursday Nov. 25. 1880.

High Vacuum. Last night Mr. Edison, Harry and assistant run a pump on 25 lamps until about then about this morning when no blue cone is brought to the lamp by a powerful magnet and were about ready to seal off when all oxygen lost their vacuum and lamp.

Absent. Evening all day this Thanksgiving B. D. Mott, Nichols, Acheson, Hammer and several other absent from Park site most absent from Work Date point.

Friday Nov. 26. 1880.

Papers. Tribune to day publishes the interview of their reporter with Mr. Edison which in the main is a correct report. They do not however go much outside the statements of Mr. Edison. Evening Express mentions Saving Journal of Train and the Museum all Museum Factory. Petition put up in second story adding the Museum department from the elevator etc. Wm. Bloom removing the carbons from four or five hundred lamps in which they had been sealed by clamps other than Platinum to put them in Platinum clamps and have shaped glass with wires through the flat seal. The iron pipes for power pump all in place and the boys are running mercury through carrying considerable dirt and dust each time.

Buckeye. Mr. Wade is preparing a contract with binding specifications for signature of the Buckeye engine Co. previous to their building the 250 H.P. engine for experiment and use there or elsewhere on large dynamo.

Nov. 26. 80.

Armature. Dean tried his machine attachment for bending the copper strips in form for the armature and finds it to work very satisfactorily.

High vacuum Engine run all really all night again for current for the experiment in the Laboratory on high vacuum one lamp, gotten off the pump with exceedingly high vacuum, in which a powerful magnet produced the blue on the form of a vapor or diffuse halos around the platinum wires.

Decorations. Mr. made a bracket and small light socket from rubber scrap small and airy, and was requested by Mr. Edison to send it up in a commercial form.

Glass. Six tubes and the bowl of Globes and tubing received from the Corning Glass works this morning.

Water Engine. Not running this morning in consequence of water. The Pump in gulley started and about eleven o'clock water enough had been pumped in the pond to warrant starting up.

Papers. The times to day publishes two articles touching upon Edison and the electric light. The one intimating that all substances tried for carbons so far have been unsuccessful and that the perfection of the carbon and lamp depends on the discovery or not of some vegitable production not yet tried by him and that Mr. Beaubien was sent for Para in Dec. 4 in the city of Para to gather and forward from Brazil all he finds worth some pains etc.

The other is a short editorial stating that Morton and Bailey claim only to have made the invention of using gasoline vapor in lamps as a matter of great value if not entirely essential to the perfection of an electric lamp, and further that although Prof. Edison and Davis accuse him of stealing and copying from them, they have not stated in what particular not stated what they used as durgen any of his claims.

About 6 P.M. Mott left for home at 11 o'clock.

Work general of past week. Mr. Batchelor and assistants preparing the pumps and pipes for the power pump and clean Mercury. Mr. Edison with two of their assistants making experiments in high vacuum in Physics Laboratory. Dean and usual assistants pushing work on the large armature. Logan and others on Magnet Frame etc. of large dynamo.

Edmund G. P. Mott resumed work at home at Midnight last night.

Victor Lean that Sarah Burnhart was in work at Laboratory on Sunday. To day Messrs Lean Goddard and usual others.

Carbon carrying. I find in Book No. 123 page 93 etc. sketches and notes made on the 28 & 29 Nov. by Mr. Edison of ways and means to prevent or compensate for the carbon carrying over, on the lamp, one of which is a spring trap. for this subject see also Series 16 under head "Specacque Bath Carbons".

Interference. Evidence which was commenced on Monday on Quadruplex interference is being continued today in the Office.

Coal dust. Men were sent here and on Sunday prepared the fire box of Boiler for grate for burning dust coal, with intention of making an experiment of burning it directly under the boiler.

Chemically Pure The carbons made by Mr. Lane
treated carbons

mentioned in his note No. 24
which were taken to the factory were put
in lamps and sent up here, and ex-
hausted Monday night the treatment
so far as I can learn, was not conclusive
beneficial, at least not enough to
warrant the extra of treatment.

Burleigh contract. Mr. Clarke finished the
contract between Burleigh Engine Co. and
Edison Electric Light Co. ready for sig-
nature and duplicate commenced by
E. A. Mott. coming 18 pages.

Absent. Mr. Clarke went to Newark carrying
with him the contract with Burleigh Eng.
Co. intending to go thence to Philadel-
phia. Tribune publishes a letter of L. Bolton
denying the assertion of Mr. Edwin that
he is a boy of seventeen or was intend
away by Mr. Mason.

Vacuum experiments. All experimental
lamps, and pumps used at Edison's
on experiment on high vacuum were
removed to the factory and Herring &
his assistant, with, under the direction
of Mr. Edison, continue the experiments.

Electrolysis. Acheson in trying Alcohol
as a solution in his experiment in
depositing carbon by electrolysis was
unable to get any action, he then let
it stand a time a short time after
which gas was freely formed in the
solution.

Large Armature. Logan has turned off the discs of the large armature and to-day commenced the grinding and finishing with emery wheel.

Factory. Steam pipes are now run parallel with and adjoining the upper iron mercury pipes and the two wrapped with asbestos to heat the mercury for one set of pumps to heat the mercury, and for necessary additions to the boiler already in the lamp are ordered in a light box shown in or out by pulleys from outside. Letter press received also Bill heads and letter paper with heading "The Edison Electric Lamp Company. T. A. Edison Chas Batchelor F.R. Upton. E. H. Johnson"

Rails test. The rails of electric Rail way through which the current is conducted to the pump motor in the gulley, were tested by Mr. Upton and found to run down to 24 ohms. Still the motor runs and does its work.

Hydraulic press. The small 1½ cylinder engine was moved from the dynamo room into the laboratory and connected up and with the pump of the hydraulic press, to use it for pressing the ends of the copper bar of the large armature.

Vacuum. The five hundred pumps made last winter and spring have all been changed, broken, altered and abandoned, and the glass blowers are now at work on an order for ten hundred without spark, or McLeod gauge, but single tube with air vacuum and probably to be used for vacuum by magnet and this eventually the

Spark Keys and wires were abandoned and taken down. Being to day moved in small room in the supply Mental building and is continuing his high vacuum experiments. has to day my large globe encasing the regular carbon to expand for observations in the effect on carbon carrying. Francis is also making some experiments on pumps and vacuum in this small front room of Laboratory. has invented a pump with two fall tubes in which the mercury is conducted from a small reservoir into which it is also deposited through a fall tube with contraction thus getting a vacuum on the mercury before its final use for exhausting the lamp. to day received increased facilities.

Indicates the light lines to facility were to day increased in capacity by the addition of wires as far as 8th crossing of Broad wires as far as 8th

Patent Agent contains short foreign extract to effect that judgment was deferred in the case of Post Office Department vs. The Edison Telephone Co. of London.

Returned Mr Clarke returned from Philada. this afternoon and report the probability of the Porter Allen engine being shipped the last of the coming week

Pump. The new pump for vacuum reduced of Morris & Tasker & Mr Niven personally depth 25 was received in car on the series to day.

Gasoline Hammer Laboriously constructed loop shaped with card board and is introducing gasoline vapor in the bell of the hand air pump and passing the current through a regular loop passed placed thereon on the wire carbon and is getting very nice coatings and fine appearing carbons.

Work general carpenter work. work on large dynamo under shower making pumps. Mr Bastian patent for pump jump. Mr Elwin experimenting on high vacuum and Lamps

Monday Dec. 6-80

Capers. The Sun of Sunday has report of interview with J. A. Edison again fixing twenty days from date as the time for the demonstration with Porter Allen engine and large dynamo.

Small dynamo. The armature of one of the small dynamos or motors was rewound with four wires of fine copper duck for running as generator at the factory for current for testing etc.

Visual Indicator. McLingie is making some experiments on working Jones visual indicator with a magneto call and thus avoid the use of batteries for sub-scribers phones. He succeeds in operating the indicator very well by the magneto but as yet has not been able to get the device combination with certainty.

Motor. The dynamo machine standing unused in consequence of over-heating armature, up stairs in factory was to be kept through

us to be used as motor for running shaft for boiler room for burning dust coal.

Jennie Mott cleaning the power pump, and Mr. Edison making experiments on the vacuum pumps. The feature therein occupying their attention being an arrangement by which the contraction is in a separate tube and may be removed cleaned or replaced without injury to the pump or the necessity of taking the down a tube of small diameter is contracted at a suitable point, superably near the lower extremity and is passed down into the tube when the mercury is introduced, the upper end passes through a rubber cork fitted in the top end of a narrow funnel like the tubing globe in which the mercury is stand and by passing down the small tube the deposits without dropping into the lower end of first or exhausting tube and thence through the cross tube which is slightly inclined the upper end thence up and down the suction tube carrying the air with it.

Vacuum blank in N.Y.

Tuesday Dec 7. 1880

Mercury cleaning. Dr Hallman prepared a quantity of glass for filtering mercury; tried it in a tube and found it exceedingly admirably. Dr Hall also cleaned some very thoroughly by mere shaking and then filtering through paper funnel; these operations are suitable only for mechanical impurities. Dr holds that the mere shaking concentrates the impurities which are then more readily removed by the paper filter.

Pumps. The extra tube contraction did not get down to fine work so completely as the Ratchet standard pump and quite probably not cause any change to be made in the order to glass Pumps to make 200 of the standards. Power pump gotten in position and nearly ready to start.

Electric Dynamometer entirely complied with. Mirror scale etc and so thought last week of its reliability by Mr. Richards.

same currents either direct or through the coils in their respective either give same deflection on the scale either right or left and is believed by him to be both valuable and reliable for station use.

Silver Solder. Gear made a commencement in soldering the parts of large Armature with silver solder and got good results on a couple after considerable trouble the first pot being useless enough, with the from the crucible, and last of four blows other gas connections will be made and an effort to get better blast.

Intelligence. Evidence again being taken again in Quadruplex interference and trouble here with Wilson

Silver soldering. Dean abandoned gas as a means of silver soldering the part of large armature, and is having bits made with charcoal fire.

Loss by local current of Mchne. } Mr. Clarke is making measurements etc to determine the loss in the dynamos by local cutting or currents and friction. He uses one machine as generator and one as motor or driven machine, taking the amount of current generated and speeds of machines he then reverses the machines as to driver and generator to get the mean or average. The laws of generator and motor with relation to each other have been so thoroughly demonstrated as reliable that this means of determining the loss by local current is considered perfectly reliable.

Interference bridges still being taken in the quadruplex case.

Lamp. Holzer to day showed me a lamp that was made yesterday by Hipple in which the tube for exhausting was passed through the inner tube and sealed through it between the clamps and the point of sealing with outer globe and doing away with the tube on top of globe, after vacuum is obtained the tube is sealed off now with the lower end of inner tube and there does not show as part of the lamp. difficult to make however, and for that reason probably impracticable

Sourpump. Runs to day with mercury pipes being connected only from one reservoir to the other. Although run at slow speed it passed the mercury up very nicely and very encouraging results are reasonably expected.

Vacuum pumps some have been provided with tube shaped reservoir containing glass through which the mercury will pass into the exhaust tubes.

Interference. Evidence resumed in the gouraud telephone interference case.

Papers. The American Machinist of this week speaks of Maxime Lamp as accomplishing the results sought for by Mr. Edison and states that the gasoline vapor is removed after the carbon has been heated and built up at varn points.

Telephones. Mr. Bergmann brought out a complete telephone constructed to receive the sounds from greater distance from the mouthpiece they were put up in Boston lines by McKenzie, route receive and communicate the sounds at a greater distance from transmitter than the ordinary telephone and on a neat instrument the diaphram being placed near the base of instrument and the funnel shaped mouth piece, all cunnsl in or inclosed in the case.

Dynamo test. Bergmann's engineer making test of generator, used Ro 10 wire on the commutator to see whether he had a current. got it used waste and thermometer to get heat of armature while engine stopped to oil. on restarting succeeded in getting the thermometer and fingers out but the waste was lost and so was armature. use by him of the machines delayed Mr. Clarke in completing the measurements of law by local cutting etc.

Crew pump. Pipe connections are made and pump carrying abundance of mercury at low speed and with apparently little power, it is believed the pump will supply mercury for 500 vacuum pumps.

Friday Dec 10. 80

Paper. Smith hails the introduction or proposed introduction of the Brush light on part of Broadway as a grand Christmas gift to the citizens of New York, says that no one now expects the Edison Lamp to do household duty, but thinks that some one will produce one for that purpose.

Large Magnets. Logan finished winding with a layer of cotton roving No. 10 wire and mounted one of the magnets of large dynamo on its base.

Sealing off. A spirit lamp was arranged with a goose neck glass tube, secured in a bracket mounted on the neck of the lamp, with a small rubber hose attached for sealing off lamps with straight exhausting tubes, sent to the factory.

Visitor. Dale, agent of the Inman line of Steamers, is anxious to have Mr. Edison put the lights in their new steamer "City of Rome" and took orders

of electric lamps in exhibit to fit the oil lamps, and make them interchangeable.

Sprengpump. Has been most of the day running mercury through the pump and pipes for cleaning them and are getting them in pretty fair order.

Absent. Mr. Edison has not applied about the factory or any work to day.

Case Lamps. The last of the eighty last lamps in case broke in carbon to day after burning 211 hours.

Field & E. M. F. Mr. Clark made tests of saturation and comparative test of current on field and on line Book No. 116 page 157 etc. Most economical current on the Magnets was 3789 ft pounds or 7.6 volters which gave saturation and after that point current added to the magnets gave very little increase in current.

Saturday Dec. 11. 1880.

Carbon deposit. Hammer and Hood are making further experiments in depositing carbon from gasoline vapor in the mechanical vacuum pumps. The loops are lain on under strips of zinc board carbon in the bell of the pumps and after getting a vacuum gasoline is introduced. They have got slight deposits on the loops, but so far have not got it on the clamp which most desired.

Electric Dynamometer. Mr. Nichols determined the constants of the low resistance dynamometer, and made scale from which the economy of a lamp may be read. Book No. 118, pgs 47 etc.

Grate bars. The grate for burning coal dust were received to day and fires let down at five o'clock for filling them in and making the change.

Visitors Retd. Davison put in his appearance this morning having arrived from Colorado late last night.

Work general of past week. Screw Mercury pump put up and prepared ready for work. Work in shop progressing on large dynamo. Logan winding coils of magnets. Wires to on a melter with four mercury cups for contacts. McKenzie trying to work coil too with magnets current generated by the magnets coil too of Johnson. Mr. Blake making measurements to determine the loss in dynamo by local cutting. Nichols determining the constants for the low resistance electric dynamometer.

Double loop lamp. Mr. Edison had lamp made with two loops clamped in same clamps but standing apart, in reading at the loops further separation contrary to expectation under the law that like currents attract.

Coal dust Exp. Glass bars and discs for burning dust coal, were put in yesterday but were not ready and some coal being used.

1 H.P. Motor. One of the small machines mounted as a motor by Bergmann was received but several changes found necessary before trial can be made

14, 18 & 1/2 Lamps. Mr. Edison had some lamps made with carbons the 18 & 1/2 length of the regulars, for use in series or instead of one across in multiple arc. one of 14 and one of 18 lengths where exhausted and intensely heated, vacuum was obtained on them in 35 to 40 minutes the globe being small

Sower pump. doing regular work to day and a number of lamps exhausted, one line of vacuum pumps was completed and arrangements made for running through all the lamps possible tonight. The lamps are connected by the straight

exhaust tubes and sealed off by the blow pipe spirit lamps (Nov 10) which works very satisfactorily

Photometer. Mr. Upton to day brought two standard lamps with incombustible burners one to be used in the photometer for the factory, the candle power as tested by France was twelve. Chas Flammer finished the photometer and secured the lamps thereto and it was placed and taken to the Factory.

Visitors Mr. Lowry and son here in the evening.

Produce Vacuum. Found in book No. 106 page 85 under date Nov. 17. sketch and description by Mr. Batchelor of idea of obtaining vacuum by heating carbon in a globe to which is connected by tube with stop cock, a lamp, also a second tube with cock uncovered, but carbon expires the air through the latter, when it cools it forms one of the best vacuums possible to obtain from lamps.

Sunday Dec. 14. 1880

Factory lamps. Excellent circuit was had at the factory during the night, up till two o'clock when the engine was stopped for negligence or carelessness in the attendant not supplying water. Most twenty lamps were under pumps were broken by the sudden loss of vacuum. Martin Lewis discharged for the attendant. Coal dust. Black dirt by the dirt in water was started under the boiler and fires started up with dust coal, which dry till until about noon the boiler did not work properly and fires got very low. Got brought up and burning good the balance of the day.

Papers. Truth to day devotes a column to the Brush Arc light and the prospect of lighting Broadway from 14th to 34th St with 22 2000 candle power lamps on 25 foot poles. Supplied by current from 5 dynamos driven by a Corliss Engine. Winds up with a slight rap at Mr. Edison for having the gas appliances [illegible]

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Visitors. Prof. Prager with two ladies.

Photometer put up on track near the pumps to test the lamps before sealing off. All the lamps are now heated quite hot before placing them on the pumps by which it is found that vacuum may be gotten much quicker.

Measuring for. By a misunderstanding between Clarke and Pike, a very heavy current was put through the resistance for, and a larger proportion of the coils destroyed.

Local loss. Mr. Clarke finished one test of measurement of the loss on the machine by local current and friction. The total local loss he found to be about 15000 foot pounds or a little under 1/2 h. p. He has not yet determined how much is due to friction but thinks the greater portion is by the friction. Will make another test for comparison and proof. Book No. 116 page 161 etc.

Electrolyzer. Acheson is still continuing the experiments to deposit carbon by electrolyzer but has as yet obtained no favorable results. Book No. 155, page 1 etc.

Carbon plating. Lawson, called to the factory and set at work on plating the ends of carbons with copper etc. in small room in Supplemental building

Sockets. George Hickman is at work boiling the lamp sockets in Alcohol and rosin, giving them an oiled appearance

1/4 lamp. The lamps with carbon of one fourth length was burned at 16 candles for a time then put in series with the one third carbon and the two raised to 32 candles. The 1/4 was then put at 24 candles and burned 2 1/2 hours before breaking.

Visitors. Mr. Bidemann says Mason knows all that is being done here now to the number of working pumps and lamps taken off=

Thursday Dec. 16, 80.

Small dynamo. One of the small dynamos wound for the purpose was taken to the factory to be driven and generate by one of the motors there, to pass current for testing and use at pumps.

Interior decorations. Wm Ale finished & tried a ~~door panel~~ bracket with two points which might be turned completely around without affecting the cement or connections. It is quite ornamental and would any satisfactory.

1/3 Lamp. The lamp made with one third length carbon was put on Portsmouth at 24 candles last night and burned 16½ hours.

Pump supports. Moffett suggested and tried supporting the pumps by placing a ~~board~~ piece of timber at the bottom modified to receive the tenoned end of pump board, and spring clamps to hold the top. The top in tube was however

held by a hook shaped clench screwed on the board which took into a half slotted piece screwed on the supporting timber. The idea met with favor and will be adopted.

Small Elec. Engine. The one horse power engine mounted by Burgmann was tried last night but no power could be had from it, some defect which the electrician could not discover although working on it till twelve, thirty.

Absent: Acheson sent to Brunswick to the petroleum distillers for the products remaining after distillation brought six products. One of crude oil, one of the tar 2 of coke 2 of wax. All differing quality in appearance and body.

Water. Water supply exhausted and Agw with team drawing from the brook all day.

Dynamo Station. Acheson is tinning cable for coupling the machines in Brilliant Arc for the lamp lines, introducing a No 10 wire from each machine of a line, or about five machines to each pair cables.

Vac Pumps. Forty six pumps comprising one line were completed to day, and as the pumps working on lamps, about six o'clock 44 lamps were put on and exhausted very satisfactory.

Plating Lawson is plating the carbon ends at about eight an hour, and Henry is conducting experiments for uniting the wire and carbons direct by plating them together without an manufactured clamps

Small dynamo. The small dynamo at the factory for current for testing is run from counter shaft driven by the blower motor, does not give as much current as expected but enough for the purpose.

Gas Furnace. Wm. Anderson finished a model of the gas furnace, for Patent Office; they in this case requiring a model.

Papers Evening Post gives another column to Brush and his lamp and experiment on Broadway.

Saturday Dec 18 80

one have power. The engine mounted by Electric Engineer. Bergmann was again tried but no go. Mr Edison found the bug in the winding of the dam magnets and corrected it by connecting the wire bottom end after which it was belted to a lathe and run a six inch cam through one inch copper bars at fast speed occasionally slipping the belt but did not stop. The power engine was not determined.

Work general for the pack week. In the shop work has been pushed forward on the large dynamo and the finishing up lamp sockets. At the Factory the glass blower on pumps and lamps and Moffett mounting and putting up new devices for securing the pumps adopted, and the castings reduced. Lawson working on plating the ends

of carbons and Henry experimenting on plating carbon and wire together. Second experiment on burning dust coal direct under boiler tried and so far with fair success. Lamps being tested and work on the lines preparatory to illumination on Sunday and Monday nights.

Blower power. The electric motor taken out of boiler room and small upright engine set up to run the blower.

Illumination: 143 miles and about 119 making a total of 181 lamps inside, since lit up last evening, and the engine tested for economy, and indicated by Mr. Clarke. Average economy tests

1. expired applying the 5 shoes & 11 falls.

area of facilm diagram. Back end .30 sq. in. Front end .57 sq. in. Indicated H.P. 12.46 – Average of diagram with lamps on. Back end .145 sq. in. Front end 1.525 sq. in. Indicated H.P. 41.55 – H.P. due to 183 lamps 29.09 – or 6.3 lamps per H.P. The amount of water per hour by indicator was 114 29.91 lbs or 34.4 lbs per H.P. per hour. Mr. Clark says that the amount of steam used by the engine should have given 7.3 lamps per horse power, otherwise that a good engine should have given the same results with 30 lbs of steam per hour per H.P.

Visitors to last night's illumination, Mr Buchanan and some friends –

Coal. For the present the pea or dust coal has been dispensed with and large coal is in use under the boilers to day.

Small dic. engine taken up stairs in the Laboratory to day, but again "tugged" up and took all the afternoon to get it to run. Mr. Edison finally decided the connections and again got it to working.

Lazonby Visitors Aldermen } In the evening, by invitation the Aldermen of New York kept over here to see the working of the lamp and system, and to partake of both solid and fluid refreshments. The room of Laboratory was illuminated with 37 lamps and presented a fine appearance. About ~~235~~ 239 lamps were illuminated. The boys had their racket at Davies's. Part of whom celebrated at their own expense.

Papers. Sun. World. Herald. Truth and Tribune give fair and favorable reports of the display and working here last night. - Also dispatches that the suit in England of the Government or Telephone Companies was decided against the Telephone holding that they came under the telegraph act.

Carbonization. A chemist in making some experiments on carbons by request and direction of Mr. Edison soaking them ~~in Mineral~~ (cardboard) in different products of petroleum and carbonizing and repeating the process. So satisfactory results have yet been obtained.

Clamping & plating. Mr. Lawson has clamped some carbons to the leading wires by plating and is continuing the experiment also about to plate the ends of all carbons.

Motor test. The new horse power electric engine was again tried tonight but does not work satisfactory as regards the current and produces too much fall on the lamps of the line, giving a drop equal to 1/3 current of about six lamps. On the current, about equal to one horse power, or run 2630 revolutions with 92 volts on the line. The governor is also unsatisfactory because of its noise and the effect on the lamps. Mr. Edison suggests to govern on the field by throwing in or cutting out coils and thus strengthen or weaken the field.

Fall on lamps. Thirty two lamps were in circuit and one measured in the photometer some gave 9 candles, twenty four were then turned off and the photometer lamp raised to 15 candles.

Visitors Brewer & Waterhouse who are lamp and engineering mechanics for capitalists. Absent Mr. Edison & K.W. Clark also absent Batch.

Engine. As a compromise and with better results Large coal is being mixed on Friday with the dust. Under the boilers and water supplied by team drawing from the creek.

Motors. Mr. Upton making some tests of the one horse power motor to determine if, possibly a better sufficient improvement can be made in the winding of armature or proportioning to prevent the irregularity it now produces on the lights. The armature was taken out to rewind and higher resistance than its present 6 ohms and Mr. Edison suggests it be wound for about two ohms.

American Union wires were to day connected with the Laboratory for telegraphic communication.

Lamp tests about thirty lamps were tested at the factory for the first testing with electric dynamometer and photometer Vinda Hasler of McKeber Hasler, with the finder.

Absent W. P. Mott returned after absence since Friday noon.

400 Lamp test. 400 lamps were burned on Friday evening, Christmas eve, and Economical test made of the Engine by Mr. Clarke, boilers forced to 90 lbs. pressure engine to 75 Rev. gave 4.9 Lamps per horse power, but I believe (this result is attained) after deducting the power consumed in friction of shafting etc.

Well. On Friday morning some lumber etc. was delivered and preparations commenced for sinking a driven well at the Machine Shop. On Monday morning actual work in sinking was commenced.

Factory. Two second tier of pumps have been nearly completed but an accident causing the absence of Van Cleve put back the carbonizing and

Dec. 28.

Experiment

Lamps have not been made to get again the additional pumps.

Motor. The mounted one horse power Motor Armature was surround two shine resistance and the governor removed, a line of shafting put up in the Laboratory and Motor tried this morning It ran very satisfactorily and had no very appreciable effect on the lamps burning in same circuit.

Carbonizing Mr Ashburn in his experiments on carbonizing in connection with Brands of Lithium placed a vitrid white hot from the furnace in ~~Asbes~~ thoroughly covered and protected from the air, the vitrid, although an old Hard one, ~~the~~ came out of the sand white and natural strike color.

Wednesday Dec. 29.

Papers "New York Herald" contains dispatches from Chicago: that the Porter Allen engine in completed and ready shipped to Wards Park. Also that the Law committee of the Board of Aldermen to whom was referred the application of the Edison Illuminating Co. for privilege of laying their wires in the Streets, had reported a resolution that that Co or other Electric Light Cos have the privilege by paying to the City 10 cts per foot for the streets disturbed and after five years pay the three per cent of their gross receipts.

1/2 lamps. 7 full lamps were put at 48c and 17 half lamps at same incandescence or 24 candles for a comparative test of their usefulness. The halves show much greater tenacity than the wholes. Although the latter give an average of 1/2 hrs 17 m. against 5 1/2 48 m the average of 100 lights act. 12.50

Dec. 29.

Absent. Mr. Clarke took train at 9.00 in return says all papers signed and bargain closed with Buckeye Engine Co for 100 horse power, engine to run 250 Revolutions. Mr. Edison also left for New York at 11.00 returned early evening.

Carbonizing. In view of the effects discovered by Acheson, of excluding the air from the mondai while cooling, Mr. Batchelor sent to Labinaw, and collected the ashes of the old furnace, to use for burying the flasks at the factory.

Snow. Severe snow storm continued all day.

Snow. No work in the forenoon, changing the pulleys for the Lt. Organ & Lathe, water scarce and weather so exceedingly cold and windy that the men cannot stand it to draw.

Plating by Governor Ritchie } Mr. Edison made a sketch of a governor for an electric engine operating directly on the shaft and effecting its purpose by moving a lever or other suitable device over resistance coils or boxes throwing them in or out as the case may require. Also one of apparatus for plating carbons to the wire without use of stamps, being a vessel containing the plating solution in which one electrode is placed, the wire part containing the wire to which the carbon is temporarily attached is passed through a rubber cork which forms the bottom

of the wire or reservoir, the other or opposite electrode is connected to the wires extending out of the inner tube which extend together with the tube through the cord sufficiently low to immerse the ends of the carbons say ½ of an inch. As the plating progresses the wire and carbon are united and held by the deposit. Sketches data by him Dec 24. and taken to Mr Lake with Patent Office drawings.

City of Rome. Mr Clark commenced the drawing work on the details of the Dynamo & engine for the Steamer City of Rome of the Inman line, now building.

Chandelier the second twelve half lamp chandelier was completed and taken to Mr Edisons house

Watch. C.P. Mott remained up all night to discover if possible the person who has been on several occasions removing the plugs of the American Union wire from their proper position in the switch board, not disturbed. About six in the morning the steam pipes thawed out in the Laboratory and soon filled the chemical room with steam.

Present. Mr Edison received to day from Mr Laughlin Brown & another friend, a present of a very handsome gold headed cane.

Smothered Monday. A Monad at the Factory was buried in ashes while hot and allowed to remain all night. The carbon test to it day iron found very high resistance from 350 to 700 ohms. Mr Batchelor had sheet iron hoods or encasing boxes made in which to place the monads in Petroleum gum or other gaseous materials having been put placed therein and by

the heat of the moon gas generated to act upon the mond in place of air.

Factory Management } Notice was today posted at the factory to the effect that on and after Jany 1, 81 Mr Upton would take charge and management of that place

Sample Bamboo. Bradley cut some strips from Bamboo which he believes to be sample sent by Mr Cross to Japan and Africa. He is exceedingly fine and uniformly free of pith, came out very free from the carbonizing flask.

Arrival Mr. Clark's gone to Philadelphia Trained by reporter etc.

1880 The closing month of December gave us fine moons and ships in the sun this morning. Very cold weather and about 150 lamps in readiness for

Carbonization Achieson placed sticks of ordinary charcoal in tube in the opposite end of which was placed ~~Kerosene~~ Petroleum pitch, the end containing the carbon was placed in the furnace and gas flame burned under the outside end to make gas from the pitch which passed through the tube and ~~issued~~ through a small hole in carbon end, one treatment gave a steel like metallic look and ring to the sticks, he also observed that if the gas was shut off from the carbons while still very hot the deposit was more metallic or that by allowing the gas to come in contact with the carbon after partially cooling the deposit was dull black. thus solving the problem of the cause why in previous trials the same results were not always obtained

Exploring New Mexico

Holiday. No work in shop to day and but one a two at work in Laboratory finishing preparations for burning to-night about 400 lamps.

Illumination & Economic test. In the evening 408 lamps were burned and a number of visitors were here to see the display. Mr. Clarke made a test of the engine while running for the lamps and developing 82.8 horse power and got ~~excedingly~~ perfect diagrams. Boiler pressure 110 lbs. Revs. 75. Total H.P. 82.3 less frictional diagram left net of 61.95 H.P. on on 408 lamps gave 6.54 per H.P. less fired gave net 7.88 per H.P. or 22.58 pounds steam per H.P. per hour.

Driving the Brown engine first class for economy. Lt.

Japan, world's exhibition report of visit to yesterday, mean unlatchpin suppl. heater. Edison. Melancholia.

Driving belt. The large main driving belt was replaced and tightened yesterday while the engine was idle.

Well. Men have gone down 65 feet with the well and to day sawing their machine around and bolting it to their own engine. The bolt for holding wheel on the pulleys of inside shafting were at first used.

One half loops. A lamp was sent up from the factory with two one half carbon connected therein in series and facing at right angles to each other. Also one with one full loop & a loop or rather one half of a full loop the half being a horizon full one and unconnected at the upper end. Also one with condenser of mica & foil. All for experiments.

Visitors. Mr. Green Worcester Mass. and friend to talk and get what information he could on getting the light introduced in his dwelling house. Also Hopkins of Scientific American with artist taking sketches. Also Bidermann in the evening.

Lead cable. One box with coil of lead insulated wire. Three wires laid in small lead piping three in turn enclosed in one. Large one about 5/8 inches was received at the Laboratory.

Lead Insulation. Francis has been testing the lead encased wires on telephone and sounder and finds some induction especially noticeable with the sounder.

New Engineer. New man formerly with Mason and U.S. Elec Light Company is now here assistant with Swanson in running the engine.

Porter Allen Engine. The Porter engine was second to day. Not yet unpacked.

Visitors. Mr. Wilber here a few minutes in the morning. Also Goddard and party of friends and Hopkins with friends in the evening.

Economic test. Mr. Clarke indicated the engine again ~~last~~ to night on three dynamos & one feed supplying 464 lamps. Engine 78 Revs. with as high as 115 lbs steam pressure.

Platinized carbon. Lawson boiled some carbon loops in aqueous solution of Platinum chloride believing that when heated in vacuum in pumps the chlorine wou be driven off leaving the platinum in the pores of the carbon in a finely divided state. But what will the platinum do when the loop is heated to high incandescence? that will show.

Gauna. a gauna for throwing in and out resistance, according to the speed was finished and put on the small Eu. engine up stairs. No connections yet made with resistance boxes.

Clamping. Dr. Moses melted a pair of silver clamps in a globule on the end of the platinum wire and while hot inserted the ends of the carbon loop. the silver cooled and firmly held the carbon with very little injury to the carbon by oxidization, in thinks that by turning a cooling gasx on the globule immediately on inserting the loop, all injury could be prevented.

Factory additions. Masons are working on the foundations and carpenters on the frame work for addition to the new building for carbonizing. Also addition to front of old building for store house etc for glass.

Sorrelle John Ott finished a pair of carbons for B. lamps with key at the bottom acting on a spring, which forms the contact same style and principle of one made by Prof Ross 26. except in the Prof. Ross the

acts and forms the connection direct, without intermediate spring.

Governor. France connected four small German silver resistance boxes with the plates in which the spring of the governor contacts in such manner that when the current is first switched on, the resistance is all in and as the speed increases the governor gradually cuts out the resistance until all is out, the object undoubtedly being to produce as slight effect on possible on the lamps when the motor is first put on.

Absent Mr. Edison in New York all afternoon returning in the evening.

Special Dynamo. Logan is winding a magnet for a special dynamo machine for lighting some establishment in New York, using much fine wire and about forty five pounds of it, the machine being intended to make its own field, hence the higher resistance of the coils around magnets.

Illumination. Lit about 500 lamps at dark and burned till 8 o'clock at deflection of 173 on Galvanometer scale, being about five degrees higher than the usual burning. No leaks were made of the engine, but the boiler furnished steam for the Brown, Westy, Brown, and two digger engines.

Visitors Morgan and others of the firm of Drexel Morgan & Co. a number of stock holders, and hummings of the "Sun."

Carbonization. Acheson is getting quite uniform and good results in metallic appearing carbons, in tubes with gas from Petroleum products thereon, at ~~low heat that is~~ high red heat, and is gradually losing confidence in his theory that the dull black is due to low heat of carbons in the gas. See Jany 1.

Lamp experiments. Mr. Eaton wrote out some 9 or 10 experiments for Lawson to try on Lamps at Factory, Monitty etc, in the introduction of Chlorhydrone, Iodum etc, in the globe, to be acted on by the heat or passage on or over. See Experiments in Book No. 168 Pages 9 etc.

Papers. The Sun has a short article on the illumination here last evening, by "800" Lamps from nine Machines and that the "Ships" Engineer is expected to provide current for 1000 to 1200 Lamps.

Platinized Carbons. The carbons Platinized by Lawson were put in Lamps and exhausted, the resistance ohms were from 5.20 ohms the lowest to 8.20 the highest but on heating in the vacuum the resistance was instantly very much lower than the regulars, as shown by the higher incandescence of them in same circuit with the regulars.

Economic test. Outside 383 Lamps, inside 107 total 490 Lamps were burned all night and Mr Clark took diagrams cards from engine and had all coal carefully weighed. test not satisfactory in consequence of two additional engines taking steam part of the time and then burning in in Laboratory, during the test

Jany. 7. 81

Armature. Mr. Edison gave Moto a sketch from which to make Patent Office drawings, of an armature, designed for powerful machines in which the bars are used (same as the Brush Allen Dynamo) but the commutator is formed of discs arranged to connect the bars to the commutator. Moto tells it is intended to be more easily and cheaply constructed than the one now being made for Porter Allen Dynamo but carrying out the same principles and efficiency.

Saturday Jany. 8. 81.

Experimental Lamps. Lamps with various treated cartons and of different mechanical arrangements were completed and sent up from the Factory. They were tested by Francis Lutt are not to be arranged for trial of stability. One lamp with platinum wire coiled around one part of (say one fourth) the way up one side of loop. 2 lamps with platinum loops from same conductors, parallel with the carbon. 2 are half length cartons at right angle in series in one globe, one with a carbon bridge in two clamped separately and standing parallel with one side of loop. One with condensers tested at 48 Ω and 4. Ω lamps. cartons treated with petroleum, one with platinized loop and four treated with carbolic acid tested at 24 Ω Book No. 186 page 1 etc.

Jany. 8. 81 7 of which were Back to
Lamp test } Country serve, regular Lamps were
Regular } started at forty eight candles
this morning to be timed and their
life at that measurement determined
during the day. Nearly 5.7 to expected
Illumination Bond No 111. Page 7 & 8.
for the early morning the
Lamps were started, but the large
pulley on the counter shaft slipped
and the engine was stopped to the
disappointment of a number of
delighted parties who had driven here
in consequence of a false voluntary
notice in the Tribune that a public
exhibition was given every night and the
public welcome to visit here
Viviers Willis & Dyer, also reporter of the
Vineata Leader.
About Mr B Bitchen, also a large delighted
party in the morning.
Work general of part week. Mill agging
continued and not much water at 10 ft.
Cider Engine pierced. Mr. Upton first
made by Mr Ellis, School daymen